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# Medical Times

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MARCH, 1930

## Small-Pox Vaccine

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## Physical Therapy and Radiotherapy During 1929

CHARLES R. BROOKE, M.D.

New York City

(Concluded from page 62, February, 1930, issue)

SIGNIFICANCE OF THE GRENZ OR BORDERLINE RAYS. Letter to the *Journal of the American Medical Association*, Sept. 7. This letter was written from Berlin. Bucky, who first described the grenz rays and who moved from Berlin to New York was at the time on a visit to Berlin and had recently read a paper before the Berlin Medical Society. These rays are electromagnetic vibrations which are scarcely to be differentiated from ordinary röntgen rays but biologically they possess special properties which serve to differentiate them from the latter. In their action on the living subject they occupy a position between the röntgen and ultraviolet rays. Their action does not extend beneath the skin which entirely absorbs them. Compared with röntgen rays they exert no destructive action. During treatment the skin reddens more rapidly than with the röntgen rays but pain is absent in contrast to painful röntgen ray burns. There is no cumulative action as with röntgen rays and hence repeated sessions in which the same portion of the body is rayed have no deferred effects. There is a wide range of difference between the effective and injurious doses and danger from the grenz rays is slight. It is thus far too soon to determine the exact indications for these rays but as far as we have gone they appear to be indicated wherever irritation or stimulation is desirable. Although the author mentions gastric and duodenal ulcers among the indications it is only the surface which is to be irritated; these ulcers are mentioned only as examples of weakened general condition and the author mentions also various blood diseases, invalidism in women, etc. The fact that deep-seated general conditions can be benefited by irritation of the skin may in time give

us valuable information concerning the functions of the latter.

SOME EFFECTS OF DEEP X-RAYS ON THE BLOOD CELLS. Knott and Watt. *The American Journal of Physical Therapy*, May, 1920. The authors do not regard the presence of blood cells, with special reference to the phagocytes, in the blood counts as evidence that they are physiologically active. In order to determine the latter some criterion is necessary. With this end in view they have studied the action of deep X-rays on the blood cells. The hardest possible rays were used with a voltage of 200,000. Such rays are known to be able to destroy living cells but it is not certain that this destructive effect comes from the secondary rays. The authors proceeded to ray blood in a small chamber surrounded by material relatively impervious to X-rays. Tests were also made without this protection and the results appeared to show that the destructive effects came from the secondary rays and that this effect was in proportion to the intensity of the latter. The authors then proposed to test the rayed cells biologically. The phagocytic powers of normal and rayed leukocytes were tested on staphylococci and with very encouraging results. If normal or leukemic blood be placed in the chamber and irradiated as described, complete loss of phagocytic power in the polymorphs is observed in about 35 minutes and this loss is evidently permanent. The lethal effect supervenes at the same time in both normal and leukemic blood. As intimated, the destructive effect proceeded almost if not quite wholly from the secondary rays. Tests were next applied to the patient direct. While the irradiation of a leukemic patient was in pro-

gress the blood was tested and in about 20 minutes a decrease was observable in the actively phagocytic polymorphs. Percentage varied with the dose and amount of surface irradiated. This loss is balanced however by the formation of new polymorphs although the decline is in the long run progressive. The rays act on the cells directly, of course, but also possibly on the cell-making structures—the reticulo-endothelial system.

If a normal subject is subjected to deep therapy there is also a fall in the phagocytic power of the polymorphs, a gradual removal of the damaged cells from the blood and after several days a beginning reproduction of new cells until conditions are the same as before irradiation. We are not sure of course that the undamaged leukocytes retain their physiological efficiency and some criterion must be established for this purpose. We know that patients with active sepsis do not react well to irradiation and are apt to become worse—more septic—; and we may attribute this result to rapid disappearance of phagocytic power of the white cells. In testing these and indeed any other subjects before deep irradiation the phagocytic power of the white cells should be tested on staphylococci. Moreover if we ascertain the degree of falling off of this power we may reduce the dose to a degree which meets this loss and which will not cause further damage. If the loss amount to 25 per cent, however, irradiation should be stopped outright.

**RADIATION TREATMENT OF HYPERTHYROIDISM.** B. L. W. Clarke. *The American Journal of Physical Therapy*, March, 1929. The author practices in Brisbane where there are numerous localities in which Graves's disease is seen. However, he has treated only 44 patients of whom 37 were women. As a rule symptoms were typical with exophthalmus, goitre, moist extremities and highstrung nervous system. In many the disease was far advanced and of long standing. The question of diagnosis is not so simple for subjects with nontoxic goitre may chance to be very nervous too. The basal metabolism is our best resource for differential diagnosis and is of particular value in röntgen treatment. If the ratio is between plus 10 and plus 35 the latter is indicated but if above 35 there is likelihood of röntgen sickness. The metabolic rate is not constant but fluctuates in waves. A toxic goitre is the result of an increased number of normally active cells. In regard to the belief that röntgen treatment makes surgical removal more difficult authorities are quoted who minimize this result, which occurs exceptionally and under unusual circumstances. There may be difficult dissection in cases where there has been no X-ray treatment. A standard technic is difficult to outline but the total exposure is usually from 4 to 5 hours. The duration of the individual session depends on the case. An hour may not be excessive for one patient while half an hour is excessive for others. The peak of voltage should be about 200 with 4 or 5 milliamperes of current. If X-ray sickness develops the treatment is that for acidosis in general but it should be possible to avoid it. As for end results the author apparently cured 18 patients while 13 others were benefited and 5 patients dropped out of sight. The known failures inclusive of one death numbered 8. A point not subject to explanation is that patients from one region gave better results than the rest.

**TREATMENT OF HODGKIN'S DISEASE BY IRRADIATION.** Catherine Corbeille of the Mayo Foundation reports 33 cases of this affection in children under 15 in the *Radio-logical Review* for November. Of the total 30 patients were boys and in over half the total the disease began before the age of 5 years. The cervical glands were most involved and in half the total the mediastinal glands were involved while abdominal symptoms were also

common. Tuberculosis could be excluded by the tuberculin reaction. Twenty-seven patients were treated by irradiation and while all showed a prompt initial improvement 13 or nearly half are either dead or moribund. These lived on an average 22½ months but in only one case was the prolongation of life (5½ years) surely due to irradiation which in this case was used perseveringly. The rays were able to control the original glandular enlargements for none of these which disappeared ever returned; but they could not prevent the formation of new enlargements. Little is said of the 14 patients who are still living and not moribund but as only one apparent cure is recorded the inference is that the other 13 are still under treatment. The early action of the rays in melting away the enlargements is called miraculous and even after cachexia is developed marked improvement is seen. We infer that if the treatment could be kept up incessantly more cures would result but this is difficult. Radium seems to have been used in half the cases as well as röntgen rays and a few cases were treated with radium exclusively. Other methods of treatment are useless and surgical extirpation of cervical glands was always followed by recurrence.

**INCREASED USE OF IRRADIATION FOR CANCER.** In the London Letter of the *Journal of the American Medical Association* for Nov. 23 it is stated that an administrative change has been inaugurated in the Middlesex Hospital, London (the one local hospital with a special wing for cancer cases), which is one of the most striking advances in British radiology. An anonymous donor has given 5 beds for 7 years to be in charge of the hospital radiologist who will care for such cancer patients as wish to avoid operation, subject to the decision of the hospital authorities without interference from the surgeon. In other words the family physician may pass them directly to the radiologist. Formerly only the surgeon could refer them to the latter. The clause, "if such treatment is advisable", meaning irradiation, seems to be left to Dr. Douglas Webster, who is in charge of the irradiation service for the entire hospital, but as a matter of courtesy he may consult with the surgeon in all new malignant cases as rapidly as admitted. This method, which is called ideal, was used by his predecessor, but the consultation seems to have been perfunctory for irradiation has been regarded as an adjuvant only and indicated chiefly where surgery has failed. The elimination of the surgeon is perhaps in deference to the reluctance of the patient to submit to operation and to consult a physician lest he turn the patient over to the surgeon. But if the family practitioner can refer the patient directly to the radiologist this fear may be abolished and the patient may reach the hospital at a much earlier stage of his disease.

**FIVE YEAR END RESULTS OF IRRADIATION TREATMENT OF CANCER OF THE CERVIX.** H. Schmitz. *The American Journal of Physical Therapy*, Jan., 1929. The author says but little of radium in this paper. The indications and technic were those ordinarily used. The period covered is 1914-1923, only five year or more survivals being reckoned. The total number treated was 470 and of this number 138 represented recurrences. The voltage was varied from time to time for up to the end of 1919 the maximum was about 110000; during 1920-1 it was 140000 and after that period 211000. Other features of the technic were also changed during the period in accordance with experience. Thus since 1924 a water cooled tube has been applied in place of a large Coolidge tube. In regard to end results, to begin with these have not been good for recurrent growths save when these were localized and freely movable and such of course were in a minority. Of the primary

growths the percent of salvage at the end of 5 years gradually increased with change of technics from 14.02 to 20.32. But there is a large contingent of cases in which the result was more or less uncertain and if the treatment is given the benefit of the doubt the maximum figure would be about 35%. This superiority is attributed chiefly to the use of the shorter waves consequent on the high voltage. No effort is made to contrast these results with those of surgery and especially with the Wertheim operation nor are the figures of any other radiologists given. Nothing is said as to how many of the 332 primary growths were ineligible for the knife or if they were all routine cases of the type in which the knife is usually employed.

**RADIATION TREATMENT OF CARCINOMA OF THE UTERUS.** F. Voltz in the *Arch. f. Gynakol.* for April 24 gives statistics of 1448 cases of cancer of the cervix treated by radiation between 1913 and 1923. Of 227 strictly operable cases of which 94 were treated by radium alone and 130 by the combined method over 40% were cured and if we deduct 44 cases in which the treatment was incomplete the percentage is increased to over 50%. In the group of 310 borderline cases the percentage of salvage was 22.3 but as before if we deduct the cases incompletely treated this figure is increased to over 28%. Of 543 cases which were technically inoperable the salvage was nearly 11%. In a final group of cases not only inoperable but technically incurable the author succeeded in saving 3 cases out of 239 patients. The gross salvage was 15.4% of the 1339 cases which could be followed up, but with correction for incomplete treatment the figure increases to 18.2%. The salvage in 88 cases of cancer of the corpus was about 40%. Of much interest is the contrast between patients with ample means and those in straightened circumstances. The salvage in the former was 32.6% as against only 14.6 in the proletariat. This contrast has not usually been brought out in statistics of the therapy of cancer. Another paper on the same subject by Strassmann in *Strahlentherapie*, vol. xxxii, deals with a material of 429 cases treated between 1913 and 1923. The salvage in operable cases, 5 year interval, was 64.3% for cancer in the earliest phase and 22% in a more advanced but operable stage. The salvage of borderline cases was 17.4%. The net salvage for the entire group was 25.7%. In the inoperable series the salvage was but 4%.

**THE ARTIFICIAL CLIMACTERIC PRODUCED BY RADIUM.** P. C. Fenwick. This author, who is a specialist in radium and deep röntgen therapy in New Zealand, relates his experience in the *British Medical Journal* for Sept. 7. In the past 4½ years he has treated 89 women who suffered from severe uterine hemorrhage, the average age of patients being 47 years. Each case has been followed up and 73 of the number are cured while 2 have dropped out of sight and 13 have been treated too recently for statistics. There remains therefore but one actual failure to date. Naturally these patients were anemic from loss of blood and in poor general condition. Care was taken to exclude all cases of hemorrhage due to fibroids and cancer. The routine treatment consists of 50 mg. radium element introduced by means of a uterine applicator within a platinum tube in turn enveloped in rubber, left in position 24 hours (1200 mgm. hours). In twenty cases hemorrhage ceased at once, in addition to which 17 ceased within the first month. Five other cases ended successfully within two months and only two required 6 and 7 months respectively for complete recovery. The shortness of the duration of treatment shows that cessation of hemorrhage

was not attributable to change in the sexual life from natural causes. The author is loath to treat young women with menorrhagia but in two cases mentioned the hemorrhage ceased without cessation of the menses. He also is opposed to treating bleeding from fibroid uterus but obtained good results in 3 of 6 cases in which the knife was refused. Careful comparison with the normal climacteric seems to show that the type induced by radium does not differ in any respect from the normal. The number to complain of hot flushes was 29; of headaches 25, etc.

**DEATH CAUSED BY RADIUM PROVED IN AUTOPSY.** According to the daily press of Dec. 9 medical evidence that radium poisoning can cause death was obtained at the autopsy of a Mrs. McDonald who died recently at the Memorial Hospital, New York. The autopsy was performed by Dr. H. S. Martland, chief medical examiner of Essex Co., New Jersey, who is regarded as the first to discover the existence of industrial radium poisoning, as it occurs among the women employees of the U. S. Radium Corporation of Orange, N. J. who contract the disease from painting the luminous dials of watch faces. The autopsy was witnessed by a number of distinguished scientists and as in four or five previous cases tumors were found in the viscera in addition to radium osteitis of some of the bones. In the present case the tumors consisted of a primary growth in the pelvis with numerous visceral metastases. The growths were sarcomatous and this factor was the basic cause of death with radium poisoning as the contributory cause. It does not appear as yet why these victims should all present sarcomatous tumors. The patient had been doing well for some weeks and her death was quite unanticipated. Four other victims of radium industrial poisoning are in apparently fair health although compensation has been awarded them in the belief that they cannot recover permanently. Mrs. McDonald has two young children, born after she had become poisoned, and there is a possibility that the disease may have been transmitted to them before birth. The autopsy will not have been completed until Dr. Gettler has extracted the radium emanation from the victim's bones.

**FAILURE TO RECOGNIZE ROENTGEN RAY DAMAGE.** Paul Krause reports cases of mistaken diagnosis in the *Deutsche medizinische Wochenschrift* for Nov. 15. Within one year he has seen 3 cases, in each of which there was injury to the face. In a course of lectures to the medical profession one of the doctors was seen to have a typical röntgen eczema of the face. He had regarded it as due to the use of disinfectants of the skin. He worked with a röntgen apparatus but had neglected to protect himself sufficiently. In a similar case a young physician wrongly interpreted an eruption on his forearms which had not been as well protected as his hands. The third patient was not a physician but was active in a röntgen laboratory. Since 1902 he had had a röntgen dermatitis of the hands which ended in ulceration and amputation of an index finger. In 1923 the author saw the case, then an example of röntgen cancer. By reason of enlarged glands at the elbow joint the author advised amputation above the elbow but the microscope showed that the glands were not cancerous. Amputation of the forearm only was done. The cancer reappeared and the arm was disarticulated at the shoulder with resection of some of the ribs. However the patient died with cancerous metastases in both lungs—an example of a röntgen cancer becoming generalized. In the first two cases the physicians did not even know that the typical chronic eczema of the face was due to the rays. All three cases might have easily been prevented



by proper protection. Every form of care has been exercised to induce those who use the apparatus to use full protection. Examinations should be held before any certificates of proficiency are issued and every one should be licensed before being permitted to work with the apparatus.

#### Miscellaneous

**THERAPEUTIC USE OF SOUND WAVES FOR DEAFNESS.** According to a Science Service Bulletin released May 6, sound waves have been introduced into the treatment of deafness by Prof. Skriski of the Leningrad Institute for the Deaf and Dumb. The first waves used are for diagnostic purposes and vibrate as slowly as 106 per second and as high as 12000 for the same interval. If the hearing chance to respond to any wave frequency sound waves of greater intensity are directed to this register. The principle is likened to massage in its results. Further treatment is along the same line, directed against the "island of hearing" which yet remains to the patient. But some of these are of no practical value for the pitch may be higher than the range of hearing itself. Hence only islands which come within the latter are subjected to treatment by high intensity sound waves. The result of successful treatment is an increase in the dimensions of the island. Some improvement has even been seen in those born deaf.

Quite different from the preceding is a method introduced by Mülwert, of the Technical High School of Darmstadt, for he uses sound waves which are above the range of human hearing. The optimum frequency he computes as 30000 per second—that is, these inaudible waves give the best results. A meter attached to the apparatus gives the operator the proper dosage. The above reports have become known in the U. S. and have aroused some interest but thus far no reports have come in.

**HOT BATHS IN THE TREATMENT OF DISEASE.** Editorial in the *Journal of the American Medical Association* for Nov. 23, 1929. The use of fever producing substances in the treatment of various diseases and notably that of malarial blood for neurosyphilis has revived interest in the more physical measures like hot baths and diathermy. The editor quotes from a recent article by two neurologists on the production of hyperthermia by hot baths. The ancients used both artificial hot baths and hot mineral springs in the treatment of various diseases but of course were not interested in the production of fever, although the degree and form of heat used was sometimes sufficient to cause death. Special studies were made at Stanford University by the authors, Mehrtens and Pouppirt, reported in the *Archives of Neurology and Psychiatry* for October. Mouth temperatures are not dependable for measuring the degree of hyperthermia and the authors relied on rectal readings. The baths were started at 110° F. with gradual reduction to the temperature of the patient. Mouth temperatures were never less than 104° and often ranged as high as 107° F., controlled by rectal measurements. The tolerance of patients varied greatly. The fever can be maintained from one to two hours. The injection of malarial blood can give as good a result with less trouble but in using it we are giving the patient a new disease. Baths can be given daily for at least 6 weeks and the patient may receive any other kind of treatment and also does not lose in weight or strength—in fact sometimes gains. These baths should be a valuable adjuvant to drugs in the eradication of syphilis.

It would be worth while to treat gonorrhea in this manner for we know that the gonococcus is sensitive to the

action of high temperatures. No mention is made of the associated use of diathermy and hot baths.

**WORK THERAPY.** Dr. W. Egloff of the Medico-Mechanical Institute of Stuttgart discusses this subject briefly and with a question mark in the *Munchener med. Wochenschrift* for October 25 refers especially to a certain type of injury of the shoulder joint which is followed by ankylosis—it is immaterial whether it is a fracture, dislocation or contusion. After a few sessions of massage the patient is told to resume his work or take up some kind of salaried work, only to learn that he is incapable of performing his duties. It is now found that the adhesions in or about the joint must be overcome which is a most tedious process and one which moreover does not always come out well. In such cases the original physician in sending the man back to work has presumably certified him as sound. The author does not underestimate the value of work therapy—of working at one's regular calling—and all physicians hate to call a man sick any longer than necessary but there is no use in sending him back as sound if he cannot hold down his job. If a man who is unable to do this is ordered to do gardening, chop wood or take certain kinds of exercise while getting back to form it is at least possible for him to drop his work at will which he cannot do as an employé. The author of his own experience knows that this amateur work will remedy these adhesions and ankyloses and he has had a personal experience in his student days. Naturally there is nothing novel in this viewpoint but the term occupation therapy should be enlarged to include these amateur efforts. There is possible here a great variety of effort, with frequent change of occupation, and in stiff shoulders especially but also in ankyloses of other joints these efforts should be carried out before the patient is pronounced fit to return to his regular occupation. Naturally this subject is closely bound up with disability insurance.

#### The Treatment of Lung Abscess by the Bronchoscope

F. R. Herriman and F. Welker recommends that lung abscess should be treated by aspiration and cleansing of the cavity with the aid of the bronchoscope, which affords a safe and efficient means of doing so. Surgical treatment should, in their opinion, be restricted to those cases in which the bronchoscope has been tried and has failed. The bronchoscope is passed under local anesthesia, an injection of morphine and atropine having been given half-an-hour before, any bleeding is controlled by the application of adrenalin. The bronchoscope is passed into the affected lung, and the tributary draining the abscess cavity is searched for; when found, a cannula is introduced and the pus evacuated by suction. The cavity is then washed out with normal saline followed by instillation of 25 per cent argyrol.—(*Medical Journal and Record*, New York, October 2, 1929, p. 361.)

#### Cancer Immunity

It is believed that, as a cancer grows, it gradually begins to set up its own active immunity by the formation of antibodies, but unfortunately the disease almost invariably kills the patient before the immunity is of such a degree as to limit the further progress of the cancer. In the exceptional instances in which true spontaneous cure of cancer occurs (and I know of two cases in my own practice) the immunity outstrips the cancer. Lumsden believes that the antibodies are activated by a substance produced from the lymphocytes. If so, this may help to explain the invariable presence of lymphocytes at the actively growing edge of a cancer, as they can hardly be there solely on account of the irritation produced by the growth itself.

Who knows but that we may not yet be able to take protective advantage of the immunity produced by a neoplasm by purposely setting up a superficial cancer by means of one of the known carcinogenic agents and then completely excising the growth after allowing sufficient time for the immunity to develop, but before the danger of dissemination has arisen.—McKillop, *The M. J. of Australia*, Aug. 10, 1929.

## The Personality of Edith Cavell\*

ALFRED GORDON, M.D.

Philadelphia, Pa.

The great event which occurred eleven years ago was literally speaking a cessation of hostilities for the time being, but the importance of it lies in the opportunity given to the combating parties to bring to light all the moral and the intellectual forces for a clearer conception of the real factors in life which lead to Progress in the world, namely: indulgence, mutual understanding, sympathy, good-will and finally, universal peace. The events following the original Armistice Day proved it to be correct. Everywhere we witness continuous serious and sincere attempts to make this conception of peace universal for all humanity. In order to present in the proper light the principles underlying this conception, I have chosen for my theme an outstanding personality which embodies them in the most illustrative manner. I refer to the late Edith Cavell. Avoiding entirely the political phase I will confine my remarks principally to an estimate of this interesting human figure from a point of view in which I may claim a certain amount of competence.

In any attempt to appraise a personality one should always direct attention to the activity and especially to the motives underlying the actions, to the disposition, to the general attitude of the individual under normal and particularly under trying and difficult circumstances. In the case of Edith Cavell permit me first of all to indicate a few facts from her life during the War period with which we are all familiar and which will serve as a basis for a proper analysis of her make-up. They are as follows: (1) She was calm and resigned during the most horrifying moments. (2) To quote her: "I have no fear and do not shrink." (3) "Patriotism," said she, "is not enough; one must have no hatred, no bitterness towards anyone." (4) In the beginning of the War she insisted against advice upon going from England to Belgium: "My duty is in Belgium," said she. (5) She placed her nurses at service of the wounded before the German General. (6) When implored by friends to leave, she exclaimed: "Impossible, my duty is here" and accordingly she worked arduously. (7) She gave refuge to wounded soldiers, showing a highly developed humanitarian impulse.

To one who deals daily with psychological matters in normal and morbid states, the few personality features just mentioned speak volumes. They enable one to build up an entire human structure. What are then the hidden forces which made Edith Cavell act and express her actions in the manner seen in the few chosen sentences just mentioned?

Let us digress for a moment and call your attention to what is going on in the behavior of every human being. We are accustomed to think that our lives are controlled exclusively by our reasoning power. This is not correct. Sensations and emotions of all kinds are in reality the powers behind the throne. They control our actions and behavior; they dictate our daily activities; they, I dare say, dominate our personalities. The behavior and conduct of every individual is influenced by two forces; one is the conscious force, and the other is that which deals with emotions, feelings, and with all the impressions which an individual has ever received during his lifetime. The conscious force or the intellect bridles the emotions and constantly tries to direct them into socially proper

channels. However, the emotional forces are always exceedingly powerful and in many instances they overcome the intellectual forces. The emotional elements vary in different individuals; in some they are exceedingly complex and powerful, in others less, and human behavior correspondingly varies. Should the emotional associations be of a high order and rich in their contents, our relations to the surroundings will be extremely beneficial to all. When the emotional complexes are of a lower order, great damage will be inflicted on everyone with whom such an individual comes in contact. While we are all born alike, materially and exteriorly speaking, we differ from each other with respect to our mental make-up and especially with regard to our emotional orientation.

In normal life the intellect may be developed, knowledge may be taught and acquired. The emotional side of our life presents a different problem. Some of us are highly emotional and impressionable. Consequently the conduct in daily life of such individuals will bear the mark almost exclusively of an emotional character and is very little controlled by the reasoning power. Such a type of humanity in the best sense of the term we find in Edith Cavell. Her highly emotional make-up which governed all her activities at the expense of her intellect can be seen at each step of her short life. The few characteristic features which I have extracted from her life-history illustrate strikingly the psychological analysis which I have very briefly outlined in its application to all human beings. Her utterances, the manner of expressing her ideas or rather her feelings, the translation of her sentiments into action in face of great personal danger, her fearlessness and contempt for shirking one's duty and finally her great definition of the principle of true patriotism, in which she emphasizes with force the requisite for absence of hatred or bitterness towards anyone—all these facts denote the presence in that remarkable woman of a highly developed emotional power which not only directed her intellectual activity but which also was more precious than all the acquired knowledge in her chosen profession. One sees in her emotional domain the most valuable attributes, such as benevolence, purity of motives, loyalty to her charges and personal sacrifice. Edith Cavell embodies a principle, a central idea, a concrete picture, full of expression and with rich colors. Her personality serves as a symbolical expression of the aspirations and wishes of mankind during the life struggle. She symbolizes the highest ideals of religions. Her entire personality is a symbol of objective significance, not of fantastic images, but of concrete objects. Since a symbol possesses richness of conception, it is rarely exhausted in all its possibilities. It embraces, besides, all possible characteristic elements borrowed from reality. In the name of Edith Cavell are symbolized abstract conceptions of the most valuable attributes which may serve as guides to individuals, communities and nations in their interrelations. They are: fidelity to a principle, deep sympathy, straightforwardness, frankness, forbearance, profound friendship, self-sacrifice, total absence of jealousy, or prejudice and the spirit of revenge, finally and above all a strong and unalterable adherence to truth. As to the latter, it is the greatest stronghold: in pursuing the truthful path a man may find himself baffled and beaten off, but the spirit of truth will attack the difficulty with fresh vigor again

\* Address delivered on Armistice Day, Nov. 11, 1929, before the British War Veterans.



and again until it forces its way, defying all its assaults and all prejudices. Truth is the beauty of the world for all beauty is truth.

One may think at first glance that the practical application of all these abstract conceptions to the lives of nations in their international relations is a chimera, but this is erroneous. Truth is universal, it is the foundation of all knowledge and the cement of all society. If truthful intercourse is adopted by races and nations, it will never be soiled by any outward touch, it will always lead to the principle of virtue, to charity, to love and friendship towards one another. Then with the words of Bacon, "It is certainly Heaven upon earth to have a man's mind move in charity and turn upon the poles of Truth." There will be no antagonism in international

problems, there will be no difficulty in solving them to the satisfaction of the contending nations. A truthful spirit will lead to an attitude of good-will, of mutual consideration and indulgence, and therefore to friendship. Friendly nations are powerful nations.

The symbolization of all these precious forces is the personality of Edith Cavell. For this reason the memory of this interesting human figure is a strong and powerful stimulus when different nations come together to solve their differences. International meetings will always bear desirable fruit if the spirit embodied in Edith Cavell will be their guide. She is the ideal link between nations.

1812 Spruce Street.

## Inherited Epistaxis—Associated With Other Arterial Defects

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The first record of inherited telangiectases involving both the skin and mucous membrane, in which there was a familial tendency, was contributed by J. W. Legg<sup>1</sup> in 1876. The patient was a man, age 65, who had experienced intermittent attacks of epistaxis since early life. Two of his children, a son and a daughter, had inherited this peculiar clinical feature. The patient's sister had had similar attacks of nose bleed since girlhood. Legg's patient also presented small telangiectases (nevi) about the face, neck and trunk, but according to the history, these cutaneous angiomas were first noticed by the patient at about his fortieth year. This is the only record where the patient was thought to be an example of familial epistaxis and also an hemophilic.

Legg's report did not appear to excite much interest in the subject and it was not until 1896 that Rendu<sup>2</sup> reported the case of a man, who suffered from repeated attacks of epistaxis. He, likewise, displayed telangiectases of the skin of the face and mucous surfaces of the mouth. The clinical history was that the patient's mother and one brother were subject to similar attacks of epistaxis during the greater portion of their lives. Rendu studied his patient at length and was the first clinician to regard this condition as a definite clinical entity.

Osler<sup>3</sup>, in 1901, gave an exhaustive report of three cases and this report appears to be the first recognition of the disease in America. One of his cases had angiomas of the nasal septum, skin of elbow, nose and cheek; while a brother, aged 59 years, gave a history of intermittent epistaxis since childhood. Osler's patient had one daughter living, who at the age of 13 showed a tendency to frequent severe nose bleeds. A sister of the patient was subject to attacks of bleeding from both the mouth and nose. There were two other examples of familial epistaxis among members of this family.

Familial epistaxis is by no means unknown, although the majority of these cases come to the clinician after they have had one or more operations for the relief of naso-pharyngeal disease or for hemorrhage. Familial epistaxis is in no way connected clinically with hemophilia, but in counter distinction is—

(1) Transmitted by male or female sufferers as well

as by their brothers, sisters or cousins, who are not accustomed to frequent nose bleeding. (2) In familial epistaxis the patient never suffers from an unusual loss of blood following either injuries or surgery. (3) The number of blood platelets (thrombocytes) and the coagulation time are normal.

Davis<sup>4</sup>, in discussing the site of bleeding in nasal hemorrhage writes in part: "Occasionally the point of bleeding is higher up and farther back on the septum and the source of the hemorrhage is from the ethmoidal veins or telangiectases of other vessels. Usually in these cases the bleeding is profuse and intractable."

Among the reported instances where authentic cases of familial epistaxis had recurrent attacks of bleeding from various points of the body, special mention is made of the following selective group. Many of these experienced hemorrhage from small telangiectases of the tongue, cheek, fingers, face, nose, bronchi and rectum. The writer has studied two unreported cases and one case herein described where gastric hemorrhage, due to telangiectases of the gastric mucosa, were present, one instance proven by operation and another by autopsy. There was a history of recurrent epistaxis in other members of both patients' families.

Brain hemorrhage was noted in one of Goldstein's<sup>5</sup> cases. Pringle<sup>6</sup> studied an instance where there were hemorrhages from the throat, uvula and gingival mucosa. Kelly's<sup>7</sup> patient had many telangiectases over the tip of the tongue, from which there was frequent bleeding. Galloway's<sup>8</sup> patient had frequent hemorrhage from the mouth and from the pharynx. Anderson's<sup>9</sup> patient suffered from intermittent attacks of rectal hemorrhage. Fox's<sup>10</sup> case bled frequently from the rectum; and Ullman<sup>11</sup> cites an instance where bronchial and gastric hemorrhages were common occurrences. This patient finally succumbed to broncho-pneumonia, and at autopsy small angiomas were found located on the skin, bronchi, nasal mucosa, rectum, surface of the liver and urethra.

H. I. Goldstein, in addition to reporting eleven cases among members of a certain family, has made an exhaustive survey of the literature and has appended to his article seventy-one references. He found thirty case reports, making in all forty-one, furnished by the

literature. The pernicious tendency to transmit this defect is well exemplified in one of Goldstein's cases; a woman, age 42, with familial epistaxis, transmitted the nasal bleeding habit to each of her four children.

Writer's report of a family wherein seven of its members were sufferers from recurrent epistaxis;—Two case reports follow:

*Case No. I.*—M. Sr., aged 56 years, first consulted me in 1925. One sister is a sufferer from familial epistaxis; his mother has had intermittent attacks of epistaxis since girlhood; the maternal grandfather was subject to attacks of nose bleed, as was also his brother. The patient has two daughters and a son living. The son (*Case No. II*) had his first violent attack of nose bleed when about ten years of age. One daughter, who has never suffered from nose bleed, has two sons, age ten and six years; and the elder one of these children is reported by Dr. Joseph Wiener to have had a nasal hemorrhage in 1929 and is now suffering from recurrent attacks.

**Clinical Record:**—Chief among his complaints were obstinate constipation, intermittent attacks of tenderness over the abdomen, dimness of vision, followed by faintness, nausea and an unusual sense of fear with inability to walk for several hours after such seizures. He had suffered from attacks of nose bleed since a small boy. These attacks came on without any provocation and despite treatment and they were only controlled by absolute rest. Following each of the attacks of indefinite syncope, he experienced intense thirst, and gastric distress, which he termed "a hunger pain." At various intervals he vomited blood. His physicians had never been able to detect any isolated spot of tenderness either during or after his attacks. The taking of foods and liquids always gave him some relief and by the following day he would be able to return to work.

Two weeks before consulting me he had a profuse bleeding from the nose, complicated by vertigo, which continued for two days. There was then considerable soreness in the epigastrium, with slight tenderness over the pylorus and gall bladder.

During the first week of my care of the patient, he vomited blood stained fluid. He was extremely nervous, unable to sleep without hypnotics, experienced rypnea on slight exertion and hesitated about going to work unless someone would accompany him. The systolic blood pressure was 130, diastolic 80. Tongue slightly coated. Heart and lungs negative.

The blood coagulation time was three minutes. The urine was normal. Red blood cells 5,000,000; leukocytes 6,200; differential study normal.

X-ray study of the gastro-intestinal tract including special studies of the gall-bladder gave negative findings.

**The Skin:**—Small telangiectases were observed on the neck and anterior surface of the chest and trunk. Small bleeding areas on the nasal mucosa were cauterized several years before, which cauterization had no influence on the frequency or persistency of nasal bleeding.

*Case No. II.*—M. Jr., aged 23, consulted me May 6, 1928, complaining chiefly of attacks of nasal hemorrhage, varying in frequency from once a week to every three months, since ten years of age. Weight 141¾ pounds (20 pounds underweight for age and height); and had lost 23 pounds during the past year. He had been observing a special dietary regimen to gain weight for the past two years.

General examination detected an unusual prominence

of the veins of the arms and upper portion of the chest. There were located, here and there, small telangiectatic areas. The knee jerks were decidedly increased. Heart sounds regular at 110 per minute. Lungs negative.

Examination of the nose, oral cavity and pharynx by my colleague, Dr. Margaret Butler, revealed extensive scar tissue over certain portions of the nasal mucosa; it was impossible to locate any definite point of hemorrhage. In view of previous operations, Dr. Butler discouraged further operative procedure as a measure to control nasal hemorrhage.

**Laboratory Studies:**—Three days after a severe nose bleed the coagulation time was three and a half minutes. Hemoglobin 85%; red blood cells 4,200,000; leukocytes 8,600. Blood platelets 330,000. Five days later hemoglobin 88%; red blood cells 4,284,000; leukocytes 7,600. platelets 296,000. Clotting rate three minutes. Blood chemistry studies May 1st, 1929, were as follows:—Blood Sugar 95.5; Urea Nitrogen 16.1; Creatinin 1.8; Uric Acid 3.8 mg. per 100 c.c. of blood. Chlorides 440.0. The foregoing estimation was made three days after a rather severe nose bleed.

The urine was acid, specific gravity 1030, trace of albumin, trace of indican, an occasional hyaline cast, and many calcium oxalate crystals. Urine negative for glucose. Feces negative for occult blood.

It is the writer's ardent desire that this brief discussion, including the report of two cases of familial epistaxis, may direct the attention of both physicians and specialists to the following clinical factors:

(a) Telangiectasia may be either local or general and may involve both mucous and cutaneous, as well as internal, vessels.

(b) Telangiectases increase in size, become more conspicuous and more liable to be the site of hemorrhage with advancing years (after 40). They rarely produce hemorrhage before the tenth year.

(c) Lesions have been detected at autopsy on the skin, in the nose, mouth, tonsils and pharynx, as well as on the bronchial, gastric, bladder and urethral mucosae.

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#### The Treatment of Post-tonsillectomy Pain

F. E. Locy in over two thousand cases that aspirin applied locally to the tonsillar fossae after the removal of the gland was a much more effective analgesic than when administered by any other method. In 5 to 15 minutes after the application dysphagia disappeared in most cases. As the first effect of aspirin was to give rise to a burning sensation, a small amount of pulverised menthol was added to the aspirin powder. Menthol itself has a mild antiseptic and anæsthetic action and, in the throat, produces almost immediately a cool sensation. Tannic acid was later added to the formula to provide an astringent element, and for its effect in reducing the amount of salivary secretion. The following formula was found to be the most efficacious:—

R

Aspirin .....	3iss
Menthol pulv. ....	grs. ij
Acid. tannic. ....	grs. vj

Dr. Locy points out that care should be taken that the patient does not inhale any of the powder, as this sets up an unpleasant cough. The powder should be insufflated about 15 minutes before each meal and once between meals, if necessary. After a few days, if the slough in the tonsillar fossae becomes thick, these cavities should be washed out with warm normal saline solution. The analgesic powder may then be applied directly to the underlying granulations with better effect.—(*United States Naval Medical Bulletin*, April, 1929, p. 303.)

## Retinitis Pigmentosa

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My two patients were clear cut cases of retinitis pigmentosa with the ordinary pathology which one generally sees in these cases. There were no complications of retinitis pigmentosa such as posterior polar cataract, vitreous opacity, remnant of hyaloid artery, or pigment spots on anterior or posterior surface of the lens, and contrary to the ordinary run of patient, my two patients answered quickly and with certainty the questions asked during the field taking. The fields were taken in daylight. B. and L. Campimeter was used, and my patients were not using any drugs which could affect their fields. The only objection which could be found to them as patients, was that a strong mydriatic could not be used in photographing the disc, because of the susceptibility of retinitis pigmentosa cases to glaucoma, and then too, their presbyopic age. There was a difference of eight years between the one case and the other in duration, and the pictures as well as the fields show the different grades of pathology present in this disease, as well as the various types of fields which have been seen by some and show quite clearly in these photographs which were taken of the fundi of these two patients.

Pat. 1. S. Z. Male. Jewish. Age 52.

O. D. 20/70 —1

O. S. 20/200

Wearing

O. D.—1.50 Sph.—1.00 Cyl. Ax. 180 =20/50

O. S.—3.00 Sph.—1.00 Cyl. Ax. 180 =20/200

Family history. Two brothers, three sisters and five children, living and well. No other cases of retinitis pigmentosa in family, no consanguinity.

Personal history. Does not remember any serious

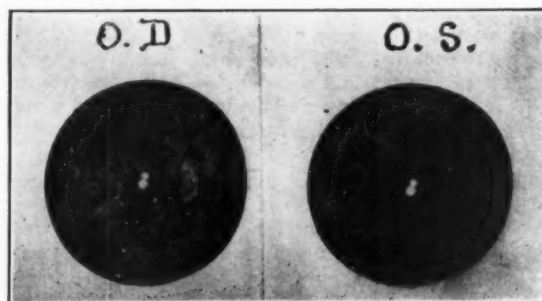
Mouth, tonsils and nasopharynx in good condition.

Heart, lungs and abdomen negative.

No urinary symptoms.

Wassermann negative.

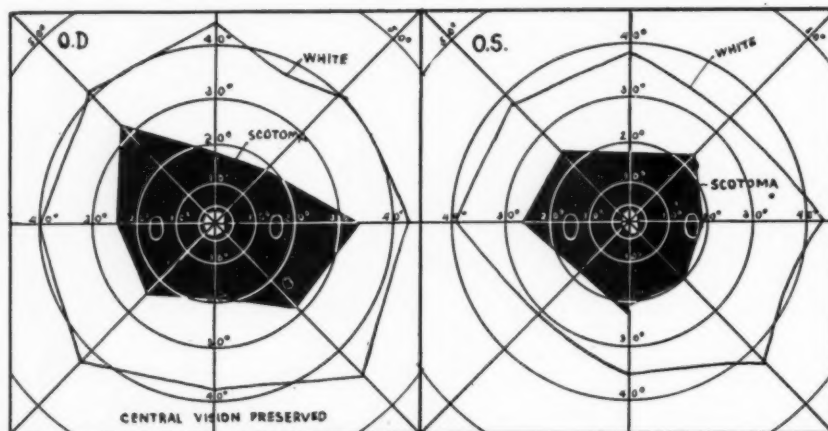
Blood report. R. B. 4,300,000. W. B. 3,200. Hm 96 per cent. Neutrophils 59 per cent. Lymphocytes



Patient No. 1.—Photo of eyeground.

41 per cent. While this leukopenia is of no consequence, I believe it is due only to the somewhat poorly nourished condition of the man on account of his long illness, and it is much different from the condition reported in Dr. Shoemaker's cases, whose lowest white blood was 10,960.

X-ray report on sinuses "shows definite increase in density in left antrum due to infection. I think this change will show on transillumination."



Fields of Patient No. 1.

disease and first noticed his failing vision coming on insidiously twenty years ago, when he first consulted an oculist. In spite of all that was attempted in his case, his condition gradually grew worse until now he can barely see with his left eye, while with his right he has just passable vision. He suffers from hemeralopia. His teeth were all removed on account of his eye trouble and he had a septum operation two years ago for same reason.

Physical exam. B. P. 138-82.

Cornea and pupil normal. Pupils equal and free—react to light, accommodation and convergence.

Nose and throat report, following the X-ray:—lavage of left antrum shows no pus; the natural opening is small and the antrum itself is small; the transillumination of the frontal and antrum is dark. The X-ray plates show the frontal absent.

Urine examination. Reaction acid, Sp. Gr. 1028. Amorphous sediment, albumin and sugar negative, casts, leukocytes and erythrocytes negative.

Eyes. Tension 20 in both eyes.

O. D. shows particularly the dull appearance of the atrophic nerve with some physiological excavation, de-





Patient No. 2.—Photo of Eyeground.

finer edges with an atrophic ring surrounding the nerve, pigmentation on the nasal side and a deposit of pigment particularly in the peripheral "haversian canals." A threadlike thinning of the vessels with veins and arteries of almost equal calibre, and atrophy of the retina showing up the tessellated light streaks, characterize the choroidal vessels. In the left eye only one-half of the atrophic optic nerve could be pictured with an atrophic ring surrounding it and a profuse unevenly distributed pigment deposit, the choroidal vessels showing through the atrophic retina and the dense area in the center of the picture. Between the optic disc and macula is a small thick greyish streak running diagonally and representing the sclerosed retina.

**The Fields.** In this man, the case being of old standing, the fields demonstrated clearly that color changes are observed previous to form changes. The enormous atrophy and sclerosis showed the pathology within both the neuro-epithelium (blue field diminution) as well as conducting paths (red and green field diminution).

In O. D. the green appeared as white and the blue appeared a "dark" color. The red was only centrally seen, pear shaped, apex up, with a 4° width; the green and blue were not seen.

In O. S. only the red was seen centrally, pear shaped, apex up, 3° wide. The scotoma area for white showed central vision more particularly in the right eye with a larger white form field in the right than in the left and a correspondingly larger scotoma in the right than in the left.

Pat. 2 M. E. Female. Jewish. Age 43. B. P. 135-105.

O. D. 2/100 Vision not improved by refraction.

O. S. 5/100

**Family history.** Two sisters and two brothers living and well—no other cases of retinitis pigmentosa in family, no consanguinity.

**Personal history.** Had ordinary diseases of childhood; seven living children; was never operated upon and had nervous breakdown 12 years ago when she complained of her eyes. This discomfort was attributed to her nervousness. Later she consulted an oculist who diagnosed the condition. She suffers with no headaches, her bowels are good. She has no night blindness but must have had retinal hyperesthesia because she saw best in reduced illumination.

A slightly deflected septum to the left with enlarged middle and lower turbinate on the left side. The tonsils are somewhat cryptic; some nasopharyngeal catarrh. Heart and lungs negative. No urinary symptoms. Wassermann negative.

**Urine.** Reaction acid. Sp. Gr. 1018. No sugar, no albumin, few pus cells and uric acid crystals. No casts, no erythrocytes.

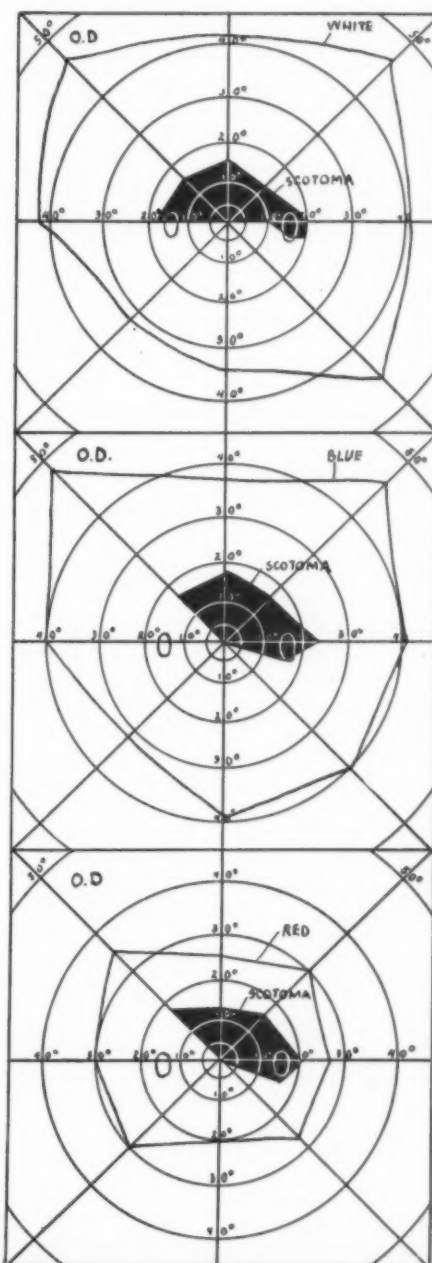
**X-ray.** "Large apical abscess about the upper left first bicuspid and lower right remaining bicuspid. Advised removal. Increased density in the left antrum and

ethmoidal areas due to pathological involvement. There is sufficient density to warrant a belief that free pus is present."

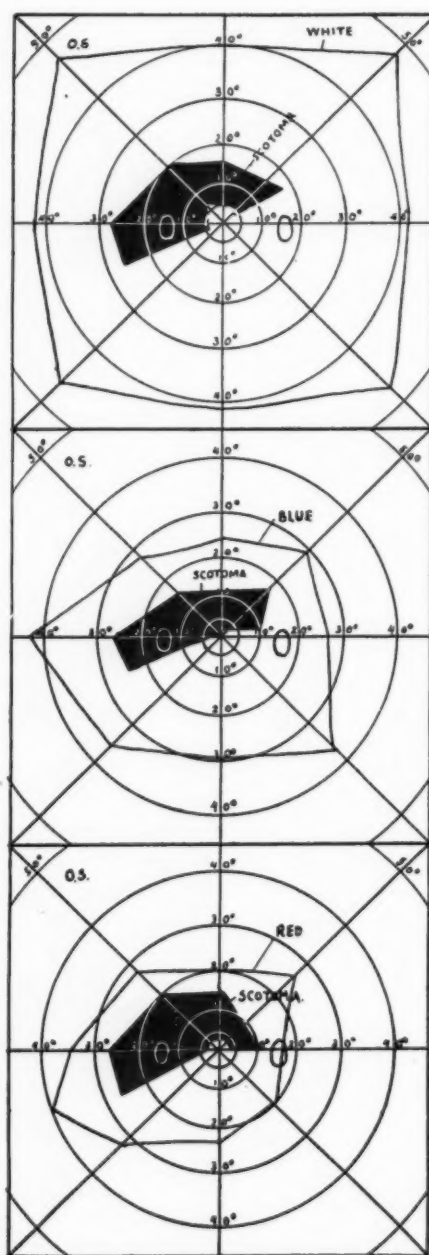
**Nose and throat report, following X-ray:** Lavage of antrum shows no free pus, transillumination of both antra is clear, as well as both frontal. Some deflection of septum.

**Eyes.** Cornea and pupil normal. Pupils equal and free, react to light, accommodation and convergence. Marked epiphora. Tension O. D. 20. O. S. 22.

**O. D.** The nerve is pale grey, the margins are blurred, the color is dull and wax like. The veins are much thicker than are the veins in the preceding case, they being almost of normal calibre. The arteries are much



Fields of Patient No. 2.



Fields of Patient No. 2.

smaller than the normal in calibre. The stellate deposits of pigment in the periphery approaching the disc are seen.

O. S. The macula lutea (lower right corner in picture) shows a larger area than in patient No. 1, the "wandering" pigmentation is scattered throughout. The veins are also larger than in the left eye of the other patient. The choroidal vessels are showing through. The macula of this eye shows a more extensive hyperemia than in the other case, another reason for the vision being diminished.

The Fields. The green for both eyes looked like a "dark shade of white" and the colors appeared better in the lower portion of the field, the patient seeing the color better as the point of fixation was approached. In the right eye all of the scotomatae, that is for white, blue

and red, came close to and encroached upon the point of fixation. In the left eye, the scotomatae appeared to show a distinct tendency to the ring type.

A comparison of my two cases showed Pat. No. 1, who from the photography appeared to have the true progressive type of retinitis pigmentosa, to have a better vision with glasses than case No. 2, who had less pathology in fundus except for macular hyperemia and retinal disturbance.

Pat. No. 1 had night-blindness and according to the teaching of Heinrichdorf "has impaired function of the retinal rods, therefore ring scotoma." Case No. 2 must have been the exception, because he had retinal hyperesthesia, seeing when illumination was less intense, yet she had a tendency to ring scotoma in left eye.

Pat. No. 1 must have been the gradual classical type of retinitis pigmentosa so often described, long in duration, finally terminating in total blindness, while case No. 2 was the more fulminant type which affected the macula first and gradually will have the other characteristics of the disease added, such as thread-like vessels, increasing pigmentary deposit and loss of color fields with increasing scotoma for white, as time progresses.

2009 Pine Street.

#### The Ten Commandments of Cancer

Do not cut across a cancer and leave part behind. The part remaining will grow more rapidly than if you had left it alone, altogether.

2. An operation for cancer is an operation to save life. Cosmetic results are to be considered, but they are not to be weighed against recurrence and death a few years later.

3. Never manipulate a cancer roughly either before or during operation or more often than is necessary to make a diagnosis. To do so is the easiest way to drive cells into the lymph or blood current—hence metastasis.

4. Do not let a woman drag you into her delusion that her early cancer symptoms are due to the menopause. The menopause is a normal physiological state, and if the woman's organs are healthy she will be healthy.

5. Repair every cervix that is eroded, everted, or the seat of a discharge.

6. Do not rule out cancer because the patient is not old. About 10 per cent of cancers occur before thirty-eight.

7. Do not tell your patients they have cancer if you are sure they will follow your advice at once. If they are inclined to delay, tell them frankly what they have and what will be the consequence of delay. If they make their own choice, let it be done with full knowledge of facts and prospects. Tell the relative or friends in any event.

8. To save your patients from cancer save them from delay. Do not wait for pain and cachexia—the signs of impending death.

9. Do not admit that incurable cancer is unrelievable cancer. Ligation, cautery, palliative removal, electrocoagulation, irradiation, and other proven physical methods may change distress to comfort and add months or years. The patient who appeals to you for relief is the one to be considered—not reputation or "the effect on the community."

10. Be always on the watch for early suspicious symptoms. Be prompt to follow them to a definite diagnosis. Be courageous enough to insist on immediate proper treatment (Weekly Roster and Medical Digest).—*Illinois Medical Journal*, September, 1929.

#### Balanced and Unbalanced Overfeeding in Etiology of Rickets and Scurvy

(Archives de Médecine des Enfants, Paris, July 1929). Mouriquand states that dystrophie caused by artificial underfeeding does not present the symptoms of true rickets. In connection with vitamin C deficiency typical scurvy may ensue. In excessive growth due to the overfeeding of healthy breast-fed infants, symptoms of rickets or scurvy do not appear because the "specificity" of the maternal milk protects the infants. In artificially overfed infants digestive disturbances occur, which favor the development of rickets but even when vitamin C deficiency is present scurvy does not develop. These clinical observations are corroborated by animal experiments. Mouriquand stresses the importance of the balance between calories and vitamins in the nutrition of infants.—*Journal A. M. A.*



# The Treatment of Cutaneous Burns

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Burns are wounds due to thermal agents. There is no essential difference between a burn and a scald except the latter is due to heated vapors. In addition to the above types of burns, two others might be added. They are burns due to strong alkali and strong mineral acids.

Dupuytren classifies burns into six degrees, dependent upon the depth of the wound, and the changes which occur locally. They are:

1. Those characterized by erythema.
2. Those characterized by a dermatitis with formation of vesicle.
3. Those characterized by partial destruction of the skin which is not however burned through.
4. Those characterized by destruction of the skin down to the subcutaneous tissues.
5. Those characterized by the destruction of the superficial structures and part of the muscular layer.
6. Those characterized by carbonization of the whole thickness of skin, muscles and underlying structures.

Within the last few years a new and voluminous literature has come into being with regard to burns, which has given new insight into the changes which take place and methods to care for these changes. These new discoveries and their application have changed our whole outlook, from one of pessimism to one of optimism, states Dr. W. E. Lee.

Rational treatment of any condition presupposes that the changes which have taken place are known; that the clinical symptoms be correlated with these changes and finally that methods and procedures be devised to combat these symptoms and restore as nearly as is possible the site of injury to its normal condition. Our present treatment of burns fulfill nearly all of these conditions.

The principles underlying the treatment of burns, in light of our newer knowledge, are the treatment of shock which is manifested early and late, maintenance of body temperature, prevention of infection, control of toxemia and prevention of excessive scar formation as far as is humanely possible.

## Shock

One of the outstanding features which strikes the surgeon forcibly, in persons seen just after a severe burn, is the profound shock. These patients have weak, rapid and thready pulses, cold clammy skins, restlessness, sub-normal temperatures and lowered blood pressures. Crile has stated that severe injuries to the sensory apparatus will produce shock and that the depth of shock depends upon the severity of the stimulation. In severe burns there is a severe stimulation of the sensory apparatus, due to the large areas of skin loss leaving exposed to the constant irritation of the secretions and the terminal sensory nerves. Dr. Lee compares this type of primary shock with that seen in other forms of severe traumatic injuries.

The body skin helps to maintain body temperature by preventing too rapid radiation. Since large areas of skin is lost, we can readily see that this too, is conducive to shock.

## Blood Changes

We know that normally the blood concentration is in a state of equilibrium. But according to Underhill, in severe burns this equilibrium is disturbed and that there

is a marked concentration in blood, which is in all probability due to the pouring out of serum at the sight of the wound and its rapid evaporation due to the extensive loss of skin. We can readily see that the more extensive the area of skin lost, the more this evaporation will be. Blood concentration may reach a high degree in cases of burns and is another cause of shock. Some of these lose from four to six or more liters of fluid per day, thereby increasing the blood concentration. When we stop and realize that blood concentration above .140 per cent is incompatible with life, the urgency of restoring and maintaining the fluid balance is of primary importance.

All authorities agree that there is an increase in the number of leucocytes, but are at variance as to whether there are morphological changes in the blood cells. There is an increase in the plasma, fibrin and globulin. The urea nitrogen shows a greater increase than the non-protein nitrogen.

Vogt and Vaccarezza have proved that there is a definite toxemia present in patients burned. This was done by establishing blood connections between two animals, one normal and one severely burned. Both animals showed toxic effects and the burned animal suffered less than if it had been alone. This was probably due to the dilution of the injured animal's blood by the one which was normal.

Pfeiffer found that cleavage products of protein decomposition from burned skin was of two kinds, necrotoxic and neurotoxic. Roberson and Boyd showed toxic products of protein autolysis, burned tissue, and that the toxic is thermolabile, non-diffusible and necrotoxic. Also that the toxic material was intracellular and not in the blood serum. Richards was able to show that by the injection of Histamine, that secondary shock could be produced similar to that seen in burned persons.

In effect it is proved that the secondary shock which is seen in burns six or eight hours after the injury is due to toxic materials formed at the sight of the lesion and is derived from the altered skin (dead tissue) and that this toxin is in the blood cell and distributed all over the body. Also that there is a marked fluid and heat loss plus the possibility of infection, which readily accounts for the secondary shock which is chiefly toxic in nature.

To add to the accumulation of facts proving that there is a toxemia, it has been shown repeatedly that the liver, spleen, kidney and bone marrow are very hyperemic of patient dead of burns. Also that there is a generalized edema of the lymphoid tissue, especially at the germinal centers. These changes in the viscera are similar to those found in children dead of diphtheria which we know to be a true toxemia.

From clinical observations and pathological findings we gleam, in a great measure, our therapeutic procedure. These clinical and pathological findings in the case of burns are:

## 1. Shock

### a. Primary

The primary due to the severe traumatism to the sensory nerve endings.

### b. Secondary

Secondary due to the above, plus loss of body heat due to loss of skin; toxemia due to dead

tissue at sight of wound and finally the disturbance of the blood concentration.

### Treatment

The treatment of cutaneous burns may be divided into several stages, namely:

1. Treatment of the primary shock. (Emergency measures.)
2. Prevention of infection.
3. Treatment of toxemia.
4. Later treatment.

### Treatment of Shock

Immediately upon admittance to the hospital, morphine sulphate should be given these patients. This medication eases the pain due to the exposed nerve endings and at the same time reduces the main etiological factor of the primary shock. Since these nerve terminals are exposed and we have an open wound, something must be done to cover these nerve terminals and at the same time cover the wound aseptically to prevent the loss of heat and prevent infection. Many treatments have been devised to meet these indications. Among those formerly used is the old carron oil treatment. This treatment does prevent the loss of heat to a more or less extent, but is open to the serious objections that the infection is not prevented, and the nerve terminals are not covered. Dilute solution of picric acid has been a favorite initial dressing and is useful in burns which are not extensive. Solutions of picric acid precipitate proteins, and are antiseptic, but unfortunately, the strength in which this drug is bacteriacidal, they are also toxic. So this treatment is very limited. Various forms of wax coatings, especially waxes impregnated with germicidal agents, have been used. The Abirine treatment certainly covered the nerve terminals and prevented the loss of body heat, yet it was open to the serious objection that it sealed up a wound that was open to suspicion. Certainly that was not good surgery.

Davidson found by experiments that dilute solutions of tannic acid had the property of precipitating proteins and at the same time making them inert and non-absorbable. This property was similar to picric acid only that the dilution of tannic acid, as used, was more toxic. This, Davidson used as his basis for the primary dressing of burns. His technique requires a freshly prepared solution of a two and five tenths per cent to a five per cent solution. This is applied to the wound with an atomizer or over gauze until the wound turns a rich mahogany brown. Then the patient is kept in a heat tent at from ninety-two to one hundred degrees. This temperature is essential to the ultimate effect of the acid. By this means he has accomplished a dressing that coats the nerve terminals, one that prevents the loss of body heat, and finally it precipitates all proteins and acts as an aseptic dressing. At present this is the treatment of choice.

The next indication to be met is the maintenance of the fluid balance. This is accomplished by giving fluids by mouth, rectum, skin and intravenously. As much as from four to five thousand cubic centimeters per day may be given. This not only helps to maintain fluid balance but helps to dilute any toxemia present. Some workers advocate blood transfusion, which might be tried if other methods fail. It certainly has rational basis in that the toxin is bound up in the blood cell and hence those cells are poisoned and cannot properly function. Exsanguination transfusion has also been advocated.

### Treatment of Toxemia

By using the tannic acid treatment, toxemia is prevented, which is the best treatment after all. By pre-

cipitating and making inert the protein material at the site of the wound and rendering it non-toxic, toxemia is reduced to a minimum. However if infection occurs beneath this dry crust which is formed with the tannic acid and proteins, this crust may be carefully cut away and the infection treated with dichloramine-T. Fluids may be given liberally when the crusts begin to peel. They may be carefully cut away with scissors under aseptic precautions.

### Later Treatment

Sometimes if the wound is very deep and healing takes place slowly it may be advisable to resort to skin grafting, which will not only reduce the hospitalization, but prevent in a large measure the excessive formation of scar tissue with subsequent infection and deformities.

With regard to the treatment of burns due to alkali and acids, E. C. Davidson advises a thorough washing of these wounds before any neutralizing agent is used. Thereafter they should be treated as any other burn.

Other treatments might be discussed, but the treatment of burns, especially extensive burns by the use of tannic acid solution, have been so satisfactory in every respect, that the older methods of treatment must make way to it.

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### The Complement-Fixation Reaction in Rabies

A. C. Marie and A. Urbain have examined the serum of a rabbit immunized against rabies in the presence of sensitizing antibodies. The serum, after filtration through a Chamberland L3 candle, was found to neutralize ten times its volume of a 1 in 100 suspension of fixed virus, whereas normal serum was unable to neutralize even one volume. Precipitins were demonstrated by mixing the serum with a 1 in 100 suspension of virus, which had been filtered through paper. To show the presence of complement-fixing antibodies two antigens were used. The first, a cocto-antigen, was prepared by grinding up a rabid brain in ten times its volume of saline, heating to 100° C. for half an hour, centrifuging, and removing the supernatant fluid; the second was prepared by grinding up the finely pulverized brain in nine volumes of saline, leaving overnight in the ice chest, and pipetting off the supernatant fluid. Using the cocto-antigen it was found that, though ten units of complement were fixed in the presence of a rabid serum from an animal immunized against rabies, the same result was obtained with a suspension of a normal or a herpetic brain. On the other hand, using the unheated antigen, a specific reaction was obtained; the rabid brain in the presence of an antirabic serum fixed 150 units, and in the presence of normal rabbit serum only 15 units; a herpetic or a normal brain in the presence of an antirabic serum fixed 30 units, and in the presence of a normal serum 15 units. It would therefore appear that an antirabic serum contains neutralizing antibodies—the latter being demonstrable by a fresh but not by a heated antigen.—*Brit. M. J.* 2; *Epit.* 36, Sept. 7, 1929.

### Brown Bread

The substitution of brown bread for white in a diet made up to approximate to that of the Essex agricultural laborer, when fed, in carefully controlled experiments, to the laboratory rat, resulted in but small increase in growth and was accompanied by physical and nervous symptoms and by habits pointing towards a lack of, or unbalance between good factors in the brown bread diet. The experiments give but little support to the propaganda for brown bread in the diet of the working classes.—G. H. Hartwell and V. H. Mottram in *The Lancet*, 2: 892, Oct. 26, 1929.

## A Splint for Fractures of the Inferior Maxilla

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The implement here shown was primarily devised for the correction and treatment of fractures of the cervical vertebrae. In this connection, it is used with side extension screws bearing upon plates imbedded in a plaster of Paris vest. It gives any extension power justifiable,

the splint in harmony with the opening of the mandible.

The teeth splint, *f*, Fig. 1, is planned to engage teeth on both sides of the fracture and hold them in alignment supplementary to the jaw supports. The bendable portion, *g*, can be so bent that the terminal portion,

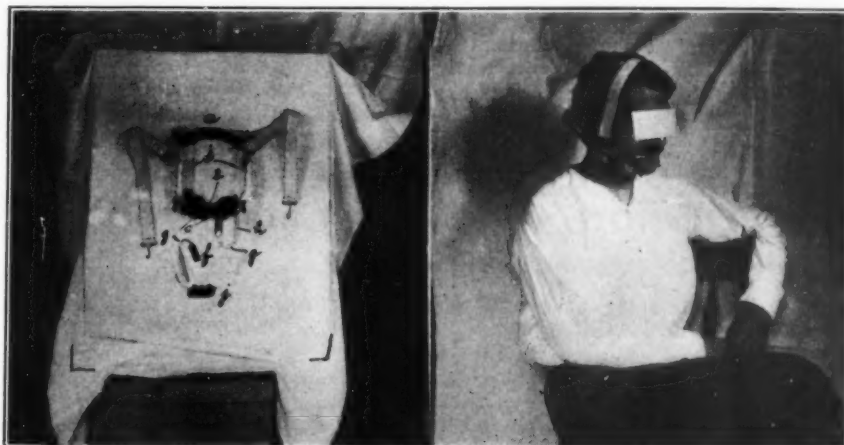


Fig. 1—*a*, occipital strap; *b*, jaw bridge; *c*, jaw supports; *d*, side straps; *f*, teeth splint; *g*, bendable portion; *h*, terminal clamped portion.

Fig. 2—Note that the mouth, teeth, splint and the jaw support maintain rigid fixation of the fracture.

and fine opportunity for further manipulation of the vertebrae.

The illustration shows how with a few modifications it proves an excellent splint for fractures of the inferior maxilla.

The splint is made of aluminum, giving lightness, x-ray permeability and sufficient strength. Its adaptation to the head gives a rigidity that makes the correction of the jaw deformity stable.

The splint is composed of the occipital strap, *a*, Fig. 1, a jaw bridge, *b*, jaw supports, *c*, adjustably attached to the bridge, and side straps, *d*. It is automatically adjustable in length to fit any size of head. The splint is held up with a pair of elastic bands. These bands must have hooks at both ends. One hook is attached to a rear hole in the strip, and the other to a front hole in the strip on the opposite side of the head. The bands thus cross each other upon the crown of the head. They cannot become dislodged. They are adjustable to give the amount of tension desired.

The occipital strap can be bent in or out to fit the conformation of any occiput. The jaw bridge is slotted so that the jaw supports can be adjusted to any width of jaw. The supports can be turned on the bridge so as to accommodate any degree of taper of the jaw. The supports have high side walls so that a child cannot pull the splint down clear of the jaw. A further prevention of this is gained by substituting inelastic bands for the elastic ones. The jaw supports and the occipital strap are the only parts of the splint that make contact with the skin. These are padded with cushion rubber. The throat is not pressed upon. The bands swing clear of the head at their attachments to the side strips. The screw pin attachment of the side strips to the occipital strap permits the movement of the forward portion of

*h*, comes between the upright of the jaw bridge and the side strap. Clamping these together immediately makes a rigid adjustment. The splint, *j*, for the mental portion of the jaw, can be bent to fit any curvature of the anterior portion of the jaw. It is similarly bent to be clamped into the side arms. In the majority of cases these supplementary attachments may not be necessary. The guttered teeth splint does, however, bind the jaw more rigidly to the splint below so that when the jaw bridge is pulled down, the jaw follows without displacement. The ability to open the mouth for the ingestion of food is an important consideration.

In applying this instrument, one side piece is freed from the occipital strap. The three other screw connections at the major corners of the splint are loosened. The splint can then be placed around the neck and the side strip be reattached to the occipital strap. The occipital strap is now held to the occiput. An assistant holds this in place while the jaw bridge is drawn forward or backward to the proper position for the fracture. The jaw supports have been separated sufficiently to allow the jaw to rest between them. All four screws at the corners are then tightened sufficiently to bind the parts in their relative positions. The jaw bridge has been so placed that the jaw supports will span the fracture through the base of the bone. The head bands are adjusted under moderate but sufficient tension to hold the splint in place. The jaw is manipulated into place. One hand controls the jaw while the other hand adjusts the supports to fit snugly against the external line of the jaw. With the adjustments completed the supports are clamped to the bridge, thus making the correction rigid.

Should the teeth gutter be needed for better alignment, the mouth can be opened sufficiently to insert the finger. The gutter is placed over the teeth on both



sides of the fracture and the teeth manipulated into place. The elastic bands are then tightened, if necessary, to give the desired degree of lift and stability. The end of the teeth gutter is then turned so that the terminal portion can be clamped between the upright of the jaw bridge and the side strip. The gutter can be curved, bent and trimmed as required to fit any section of the denture.

The chin splint is sectioned along its floor portion so that it can be curved to fit any shaped jaw. It is padded with rubber. When all adjustments are completed, all screws are tightened and the jaw is held stable in its correction in the rigidly adjusted splint.

The splint is better than wiring the teeth of the lower jaw to those of the upper in that the mouth can be opened by pulling down the jaw bridge. This permits feeding, expectoration and the use of mouth washes.

The danger of asphyxia from emesis is removed. The

dental mould, advocated by some, requires time and being for individual use only, is expensive. Delay in the reduction of fracture deformity is one of the great mistakes in the art of treatment. I am inclined to believe that my splint will give better alinement than either of the above methods. It is certainly more comfortable.

The instrument possess the following advantages.

It is immediately adjustable to any size or shape of head, and is not easily dislodged.

It is light and fits comfortably.

The degree of alinement and fixation is limited only by the skill of the operator.

Food can be taken by mouth and the use of cleansing mouth washes is possible.

Expectoration, so essential in tuberculosis, bronchorrhœa, etc., is quite possible.

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## Before and After Cataract\*

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Many of us have had difficulty in studying and handling cases before a cataract operation and most of us have more difficulty after the cataract operation has been performed.

In studying a case for cataract operation, we have been taught to make urinary analysis, take the blood pressure, have smears and cultures of conjunctival secretions made, determine the vision and examine the light perception and projection, and to look for focal infections, particularly in the mouth and sinuses.

Urinary analysis. It was formerly the opinion that patients with a large sugar content had better be left alone, but with the advent of insulin and the proper study and control of diabetes, these cases can be safely operated on. In the presence of a high albuminuric content it is safer to place the patient under a course of treatment and do the operation later.

With the presence of high blood pressure, 200 or more, there is danger of expulsive hemorrhage and protrusion of the vitreous, not only at the time of the operation, but also after.

Bad teeth and infected sinuses increase the risk and if one wants to be on the safe side one had better defer the operation until after these factors are eliminated.

With the presence in the culture of the pneumococcus, diphtheria bacillus, or streptococcus, operation is contra indicated. If a few colonies of staphylococcus or of the xerosis bacillus are present one may go ahead, but if there are many, operation had better be postponed.

The absence of light perception and projection makes a cataract operation useless, except where a swollen lens produces the painful symptoms of glaucoma, but even good light perception and projection is not always a safe guide for a favorable prognosis, for lately, I have had a case where both light perception and projection were good, but after the operation had been successfully performed we found the patient had pigmentary degeneration of the retina.

The methods of preliminary treatment by drugs are legion, varying from massive doses of bromides to twilight sleep. Most of us have tried many or all of these

methods. I believe in many cases we have done more harm than good, have upset an otherwise good stomach and have caused vomiting and restlessness with protrusion of the vitreous or iris. I am coming to the point where I believe any cataract operation can be successfully performed without preliminary drugging.

I would bring the patient into the hospital two or three days before the operation, see that the environment was pleasant and comfortable, order the usual cleansing enema and greatly restrict the diet and have the usual laboratory tests made, and the toilet of the eye carried out, which consists of scrubbing the face with soap and water and instilling into the conjunctival sac a 25 per cent solution of argyrol every four hours; two hours before the operation, instilling into the eye to be operated on 1 per cent solution of atrop. sulphate, to be repeated one hour later.

If carefully handled and encouraged by the physician, the patient will come to the operating room in good shape, physically and mentally.

I have been using a chart which I will pass around which gives the necessary instruction to the resident physician and the operating room nurse. I believe it necessary to have at all times a scrubbed up nurse who has been sufficiently trained to take care of the sterilization of instruments and the preparation of the trays which in our service is as follows: The table is covered with a quilted sterile pad over which is spread a sterile sheet, and on this we place four sterile trays for the cutting instruments. The first contains C. P. carbolic acid; the second, sterile water; the third, ninety-five per cent alcohol; the fourth tray sterile water. On this table are the necessary towels, gauze, cotton, cotton tipped applicators, eye sheet, Fox aluminum shield, isinglass and adhesive plaster. All cutting instruments are placed five minutes in the carbolic acid, then passed through the rinsing tray of sterile water, then allowed to remain in the alcohol fifteen minutes and finally placed in the fourth tray of sterile water until ready for use. The non-cutting instruments are boiled for fifteen minutes.

The instruments to be used are placed on a sterile tray. (There are no unnecessary instruments on this tray; all supplementary instruments are allowed to remain on the

\* Read before the Ophthalmic Section of the College of Physicians, Philadelphia.

sterile table.) The instruments on the tray are placed in a row in the order in which they are to be used from right to left so that the assistant can instantly pick up the right one. I believe the surgeon should have a mental picture of just what he will do. Of course, there are times when he may have to adopt a different procedure.

The patient is prepared as follows: Upon coming to the operating room, the eye having been prepared according to the method outlined above, an area near the outer canthus is cleansed and painted with 2 per cent injected at the outer canthus and while the needle is in situ it is slightly pulled back and pointed first to the upper and then lower lids. The 4 per cent cocain solution is now instilled, one drop in the good eye and three drops every three minutes for three doses in the eye to be operated on. This is followed by three drops of 1 to 1,000 adrenalin chlorid. This allows about ten minutes from the time of the novocain injection and we have good local anesthesia. Where we have a very narrow palpebral fissure, or if the patient is very restless or we suspect fluid vitreous, it may be well to do an external canthotomy. The face around the eye is again scrubbed with green soap and water, the conjunctival sac is flushed with warm boric solution, and four cotton tipped applicators wet with sterile boric solution are now used. First one, for cleansing the lashes of the upper lid; second, for cleansing the lashes of the lower lid; third, sweeping out the upper conjunctival sac; fourth, sweeping out the lower conjunctival sac. The conjunctival sac is flushed with mercurophen sol. 1/8,000, then again with warm boric solution.

The face and eyelids are painted with 2 per cent iodine, the lashes are trimmed and the lid margins are painted with 2 per cent iodine and wiped dry with a cotton tipped applicator, the eye sheet is applied and the patient is ready for operation.

Of the operation for cataract I will say nothing. Every man has his choice and his own method of doing it. It should present no terror for the man with a steady hand, a little nerve, and good instruments.

When the operation is finished the conjunctival sac is flushed with warm boric, 1 per cent atrop. and 25 per cent argyrol are instilled, the lids closed and one to three thousand bichlorid ointment is spread on the lids; over this is placed a Barraquer dressing which consists of a thin sheet of cotton about the size of a half dollar and about one-eighth inch thick, wet with warm sterile boric solution; this is pressed down snugly on the eye lids and the hollow space is built up with dry pledgets of cotton until it comes even with the face. Over this is placed a sterile pad held down by isinglass plaster, and then the Fox shield is applied and held in place with adhesive plaster. No bandage is used. Both eyes are closed in this way but the shield is applied only to the operated eye. When the patient is placed in bed definite orders are given that no drugs of any kind be administered and only liquid diet is allowed for the first forty-eight hours. This is the critical period and a special nurse should be provided; if this is not possible, the nurse on duty should look after the case very carefully.

The following accidents have happened to my cases in the last two years: A patient felt uncomfortable and the resident thought a bowel movement would relieve her so he gave her two A B S pills and a cup of black coffee. Results: a bad spell in vomiting, expulsive hemorrhage and lost eye.

Another patient wanted coffee and was given it by the nurse thinking it was all right, as it came under

the head of liquid diet. Result—vomiting and protrusion of the vitreous with a poor result.

A third patient became very nervous and began to vomit—result—protrusion of the vitreous with protracted healing and a hammock shaped pupil and a poor result. In this last case I think the sick stomach was induced by the chloral and bromides.

I have discarded these drugs, in fact all drugs, before and after the operation and now rely entirely during the operation on cocain instilled into the conjunctival sac and the deep injection of novocain.

If the operation is carefully done, the toilet of the wound properly carried out, and a well placed Barraquer dressing applied to both eyes, it is not necessary to look at the operated eye for forty-eight hours, when the eye can be opened. If it looks well I do nothing until the next day when the eyelids are cleansed with warm boric solution, the lid margins are cleansed of secretion with cotton tipped applicators wet with warm boric solution, the conjunctival sac is flushed out with warm boric, and one per cent atrop. and 10 per cent argyrol instilled. If the anterior chamber is reformed the other eye is allowed open, if not, both are closed for another day. This daily dressing is kept up for a week. The patient is allowed a back rest on the third day and allowed out of bed on the fourth when a cleansing enema is given if necessary. The patient is warned about stooping over as this often opens the wound and causes protrusion of the vitreous or iris.

In the presence of accidents or complications what shall we do? Harold Gifford presented before the Academy of Ophthalmology a classic paper entitled "Backing Out of Cataract Operations." On two occasions I have backed out.

Once a Polish woman became unruly and hysterical just as I was making the counter puncture and I was compelled to withdraw the knife and quit. No damage occurred.

At another time I was asked by a friend to assist him in a cataract operation in the patient's home. When we arrived at the house a glance was enough to show that the surroundings were such that proper aseptic preparation could not be secured. I advised my friend to postpone the operation and take the patient to a hospital. He refused and went ahead with it. Result—infection and a lost eye.

On two occasions early in my career, I performed cataract operations in the patients' homes. In both cases I had trouble, extra work and a lot of worry to get a fair result. Nothing could induce me to do it again. It is a bad practice, I care not how well the home is equipped.

**Prolapse of the Vitreous.** Cut off and put on a re-enforced Barraquer dressing with a gauze bandage snugly fitting. I tried to improve a case by nipping off the vitreous when it had protruded a second time and did more damage than good. Today I leave it alone after the first cutting and do not mind a gaping wound. I instill 2 per cent mercurochrome and replace the Barraquer dressing and light bandage and let nature take care of it. I have been surprised more than once how well she does this. The same is true of eversion of the flap.

My last two cataracts have been done by the Conjunctival Bridge Method with excellent results and I am inclined to continue doing these operations that way. In my experience the suture method does not prevent expulsive hemorrhage or prolapse of the vitreous and neither does a large conjunctival flap help after it has occurred.



I believe in washing out the debris in the anterior chamber with a properly constructed irrigator filled with warm saline but do not use instruments. One had better allow shreds of capsule and cortex remain unless they are easily washed out and later do a capsulotomy than try to remove them with forceps.

Experiments on rabbits have demonstrated that when the anterior chamber is first opened a clear fluid flows out which does not clot. If, however, a few minutes later the wound be opened, the fluid which escapes clots spontaneously. Such a clot when stained and examined by the microscope shows a structure of fibrin. Each time the eye is reopened the escaping fluid clots like

blood after standing a short time. If the anterior chamber is filled with normal saline it prevents the formation of the fibrin containing liquid and assists in preventing after-cataract.

Cataract operations are so rapidly done that neither the physician, the patient, nor the hospital authorities realize the amount of preparation or skill required in their successful performance.

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## The Span of Life: It is Not Increasing

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A retrospect of our national health conditions in the past half century is not without interest. In that time the discovery of the relation of various micro-organisms to contagious and infectious diseases has revolutionized medical science and has created a science of preventive medicine. The deadly pandemics of cholera, yellow fever and the bubonic plague are scourges of the past. The mortality of children's diseases has been reduced approximately one-half. Typhoid fever is pretty well conquered, and the conquest of tuberculosis is in sight. The influenza with pneumonia is the only pandemic to be feared in the future. In the visitation of 1918 the toll of lives from the influenza in the registration area of the United States exceeded 470,000.

As a result of a new medical science the death toll has been cut from 17.6 to 12.1 for each thousand of population. In an estimated average population of one hundred million the salvage of human life has been not far from half a million a year. In the past thirty years infant mortality has been lowered from an approximate toll of 126 to 67 for each thousand born.

All this leads straightway to a subject that seems to have been one of popular misinterpretation—namely the "expectation of life." This term is technical; it is used by life insurance companies; and upon a computation of the average number of years the policy-holder is expected to live, the rates of payment are based.

Because of the reduction of the general death rate it has been popularly assumed that the space of life has been proportionally lengthened. According to a statement published in a widely-read publication the span of life in the last half century has been lengthened by the average addition of eighteen years! But has it? In 1910 and again in 1920 the Bureau of the Census published computations showing the probable expectation of life, and the following is a summary thereof. It shows the average expectation of life at birth, at 32 years, and at 62 years of age, male and female.

Year	Sex	At Birth	At 32 yrs.	At 62 yrs.
1920	M	53.98	34.93	13.38
1910	M	50.23	33.33	12.85
	Gain	3.75	1.60	0.53
1920	F	56.33	36.12	14.01
1910	F	53.62	35.40	13.70
	Gain	2.71	0.72	0.31

This tabulation should put to rest the extravagant statements that have been widely circulated. The lowering of the death rate does not mean that the man or the woman of fifty years has a longer span of life—

much less the man or the woman of sixty-two years. It means merely that a greater number of children survive the fifth year to run the race that leads to old age. At the age of sixty-two years the gain of twenty years of preventive medicine is respectively six months and four months for men and for women. In the ten years ending in 1930, even this small gain will be less, as will be shown in the following paragraphs.

The gain in death rates due to the conquest of infant ailments is being slowly overcome by an increase of certain ailments commonly known as degenerative or "old-age" diseases; and to these must be added the mortality from the epidemics and the pandemics which are more fatal to those of advanced age than to the younger generations.

That the "gain" in the expectation of life as shown in the foregoing tabulation will be a probable loss in 1930 is indicated by the report of an insurance company for the period of 1921 to 1927.

Year	At 37	At 47	At 57	At 67
1927	31.47	27.51	16.57	10.60
1921	32.86	28.90	17.52	11.50
Loss	1.39	1.39	1.15	.90

These figures, however, do not cover the whole population of the registration area, and the time is three years short of the ten-year period of the Bureau of the Census.

Foremost among degenerative ailments are diseases of the heart and the circulatory system. In 1900 the death rate per hundred thousand of population for organic heart diseases was 111; in 1926 the rate had increased to 209; one death in six being due thereto. The proportion of deaths is greater in urban than in rural communities. The physician may arrest deterioration of heart valves, but he cannot replace nor restore those that are worn out.

Cancer is the problem upon which medical science is concentrating its efforts. In spite of a world-wide campaign to arrest its ravages, the disease year by year is increasing. According to the mortality report of the Bureau of the Census in 1928, it had advanced to second place in the causes of death. In 1900 the death rate of the registration area of the United States was 60.7 for each hundred thousand of population; in 1927 it was 95.6. Cancer is specifically an old-age disease. Before the age of thirty years, deaths therefrom are almost negligible; at the age of forty years the rate is 60 for each hundred thousand; at the age of seventy it is twelve times as great. From time to time exaggerated statements concerning the fatalities of cancer have been

published. A London lecturer told an audience of women that one out of eight of their number would be a victim of cancer and his statement was republished in the United States. As a matter of fact, estimating the average age of his audience at fifty years, the death toll would have not been greater than 2.0 for each thousand.

Apoplexy, or cerebral hemorrhage, ranks third in the list of fatal ailments. The death rate increased from 69.0 to 84.0 between 1900 and 1927. Approximately three-fourths of the deaths occur between the ages of forty-five and seventy years. Fatalities from apoplexy are more prevalent in rural than in urban communities. In this respect they differ from the ravages of heart diseases.

Bright's disease, or chronic nephritis, presents an interesting problem. Not far from ninety per cent of the deaths therefrom occur after the age of forty-five years. From 1900 an increase in mortality occurred. For the five years ending 1904 the death rate averaged 88.2 for each one hundred thousand of population; in the next five years the average had risen to 98.5; by 1915 it had reached a peak of 101.6. Then the rate began to drop irregularly; and, in 1927 it had fallen to 93. Since 1924, however, there has been a rise in the rate—whether temporary or permanent cannot be foretold.

It is doubtful if a consensus of the opinion of physicians will agree that a change in American diet will explain the change in the death rate. At all events a remarkable dietary change has occurred in the past fifteen years. The consumption of lettuce, celery, tomatoes, and salad vegetables in general has increased three-fold per capita; the demand for cabbage now used principally in the form of cole slaw has doubled, and the consumption of grapefruit, lemons, and oranges has more than doubled. Incidentally, spinach, fresh peas, string beans, beets, and onions are now in the markets the year round. In the meantime the consumption of red meats per capita has fallen off from 62 to 58 pounds; that of poultry and pork has increased in a small ratio.

Whether or not this notable change in the American diet has brought about a diminution of deaths from kidney ailments, is a question for physicians to determine. The coincidence certainly is remarkable.

Other diseases, such as rheumatism, diabetes, and ailments of the liver add to the death toll of the man past fifty years of age. All these, together with pneumonia which, ranks usually fourth or fifth among the causes of death, even ten years ago had nearly offset the gains that had arisen from the conquest of the fatal diseases incident upon childhood. But in the years following the recast of 1920, the mortality from old-age ailments has steadily increased. One cannot escape the conclusion that in the recast of the expectation tables for 1930, the gain in the span of life will be less than that of the period ending 1920.

Deducing his conclusions by mathematical formulae, Professor C. H. Forsyth of Dartmouth College has shown that the man of fifty years is not gaining upon the span of life; on the contrary he is losing. The tables prepared by the Bureau of the Census bear the same testimony.

The only unpreventable cause of death is old age, the time when the clock has run down. Were deaths from degenerative ailments decreasing, the mortality rate from senility would be increasing. The reverse is the case: the death rate from that cause is decreasing. In the five years ending 1905, the average death rate for

senility was 41 for each hundred thousand of population; for the five years ending 1927 it was but little more than one-third as great. The human animal is built for a century of years. In the main he does not die: he is the victim of his own indiscretions.

Meteorological Laboratory.

#### Later Breakfasts in Hospitals

Every profession has its critics amongst what it chooses to call the lay public, and close association with any profession is usually sufficient to show that there are very good reasons behind what the outsider is often inclined to consider an abuse. It has long been a matter of astonishment and indignation amongst a section of the public that the sick, when they are admitted to a hospital or nursing home, find themselves roused from their sleep many hours before the time at which they would be woken up in their own homes. Doctors and nurses know that the cleaning of the wards and the washing of many patients takes a considerable time, that enemata and douchings and dressings often have to be carried out at an early hour, that four-hourly medicines must be given by the clock, and that in fact the hours before 10 a. m. are extremely busy ones for nurses, whose duty it is to have their patients suitably prepared for the visit of the surgeon or physician. To harmonize these interests with the rest which is often the primary therapeutic need of the patient is almost an impossible task. The layman who is inclined to grumble when two nurses have to be installed into his house to look after a sick patient is often slow to comprehend that if all these morning duties were to be piled upon one nurse she would be quickly worn out. Twelve hours is the utmost a nurse can be asked to work, but in private it can be arranged for the change of duty to take place at the hour, be it 8, 9, or even 10, when an equitable distribution of hard work can be made. But in hospital such adjustments are not so easy, since the needs of individual patients vary. It is therefore a satisfaction to learn that the authorities of the Middlesex Hospital have been able to reorganize the work of the hospital on lines which will allow the patients to rest undisturbed until 7 a. m., when breakfast will be served. We understand that in order to introduce this reform—in which the matron, sisters, and nursing staff are eagerly and loyally cooperating—it has been necessary to bring the day nursing staff on duty at an earlier hour and that the visits of the resident and other medical officers and presumably of the students are to be postponed until after 10 a. m. The change is introduced at the moment when the new west wing of the hospital is being occupied, and the authorities believe that their example will be followed by hospitals throughout Great Britain. As much depends upon the interpretation of such a rule as upon its actual wording. If such urgent treatment as is required in the early hours for individual patients is administered without clatter, if ward maids are excluded till after breakfast, and the routine cleaning of floor and lockers is also postponed, the concession will result in securing an extra hour of rest to the patients, possibly even more. In many hospitals it is the custom to serve breakfast at 6 a. m., the active patients being provided with hot water only after the meal, while the helpless ones are washed before it; if there are many of these the process must be lengthy and some at least must be roused uncomfortably early. Any attempt to make the hospital more like the home deserves praise. A later breakfast is one way. Another is to sacrifice the appearance of the ward to the idiosyncrasies of the patient; to allow him to smoke and receive visitors during convalescence, and to accept from his friends fruit and other delicacies which the hospital cannot provide; and finally, to ensure that his friends can obtain not only news of his progress but messages of his wants on the telephone. The Middlesex Hospital is one of those with a reputation for consideration as well as good treatment, and has given new proof that this reputation is deserved.—*The Lancet*, Nov. 2, 1929.

#### Transillumination of the Breast as an Aid to Diagnosis

Sir Lenthal Cheate, K.C.B., C.V.O., F.R.C.S.—The following method of transilluminating the breast for the purpose of diagnosis was described to me by Dr. Max Cutler, of New York. All that is necessary is to take a patient into a dark room and gently impale the breast on the top of a curved Cameron light. All cysts are translucent; the subcutaneous veins on the surface of the breast are shown as branching shadows; papillomata in the breast are shown if there has been any hemorrhage into the duct in which they exist, and solid tumors appear as diffuse shadows.—*Proc. Royal Soc. Med.*, March, 1929.

# Proceedings of the New York Electrotherapeutic Society

Academy of Medicine, Wednesday, October 2, 1929

## Chronaxie

The Unconscious Tuner of Voluntary Activity

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Credit must be given to modern physiology for an attainment of exceptional importance from the standpoint of neuro-muscular correlations. I refer to the subject of chronaxie. Its application already extended to other medical fields, would be most useful in that of preventive medicine.

Chronaxie, which means the measure of the excitabil-

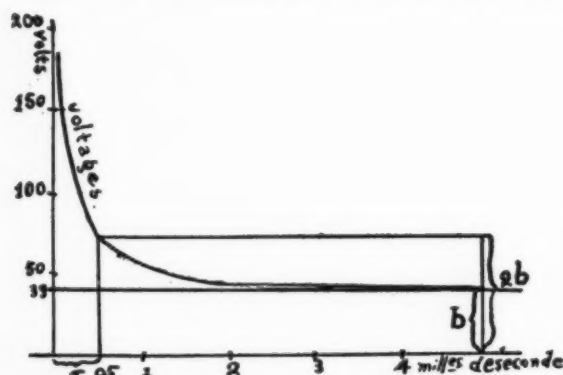


FIGURE I

An illustration of Chronaxie:

*Extensor communis digitorum* muscle (G. Bourguignon).

Ordinates represent the levels of the threshold of intensity in terms of the duration of passage of the stimulating current (abscissas). The threshold lowers when the duration lengthens itself. The lowest level of the curve is called rheobase (*b*). Chronaxie is the minimal value of the duration for which an effect with double rheobase voltage is still obtained. Rheobase (*b*)=39 volts. Chronaxie  $T=0.47$  thousandth of second.

(From the *Revue Scientifique*, No. 19, 1925. H. Frédericq, *Le Mécanisme Humoral des Actions Nerveuses*.)

ity of nerve and muscle in terms of time (Fig. 1), does not cover the centrifugal tract of the cerebro-spinal nervous system alone. As a matter of fact, it also embraces the centripetal and the intracentral transmission of impulses. At the bottom of this now experimentally established relation between the intensity of the stimulating current and the duration of its passage through the nervous tissue lies, I believe, Cajal's earlier induction on economy of time in the transmission of nervous energy (1). For *economy means measure*; and dealing with fractions of time which may or may not differ in their respective length, but which should always be perfectly adjusted in the performance of a common act—a voluntary movement—the idea of regulated succession, that is, of rhythm, immediately comes to mind.

In a recent work (2) this conception has been outlined as follows: "Every anatomical element, every kind of cell, reckons time according to a particular standard, say thousandths or perhaps hundredths of a second. In a given neurone, nervous impulses on the one hand, and excitability, on the other, are governed by this particular time standard. The impulse coming from one neurone to another can only stimulate the second one if the temporal characteristics of both are equal, or nearly so. In other words, excitation will pass eas-

ily if neurones in anatomical connections are "isochron," but will not pass at all if the neurones are "heterochron." (Fig. 2). Exactly as though they were tuning forks.

I have quoted elsewhere (3) that each muscle and its nerve have both the same chronaxie. They are isochronous. "The stimulation of the muscle by its nerve requires in some way the *resonance* of both organs. Isochronism is therefore the essential condition of their normal functioning, which is compatible only with a very slight discordance between them. In the relative speed of contraction is thus contained the secret of muscular synergies: simply a matter of harmony of chronaxies." (4).

One should expect that pathology would confirm the physiological data just mentioned above. (Fig. 3). In fact, not only the organic changes but the mere functional disturbances of nerve centers may produce effects of abnormal repercussion on the muscular groups controlled by the involved centers. In that manner abnormalities in contractions are satisfactorily explained, since "the attitude that the part of an extremity may adopt depends on the relation between the chronaxies of its antagonistic muscular groups." When, for instance, the relation between the chronaxies of the posterior and the anterior muscles of the part is higher than normal, the part is moved forward; if on the contrary, such relation is lower than normal, and the part is drawn back. Finally, if the relation is "1" the extremity remains in a rectilinear posture.

Upon such a luminous conception, applied to the whole nervous system, the theory that "neurones operate one over the other according to their chronaxic relations," has been founded (5). By working along this line, it has been established that in a general way the chronaxie is

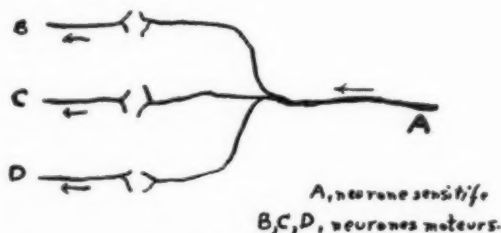


FIGURE II

Isochronism (L. Lapicque)

A sensory neuron, A, is represented in contact with three motor neurons B, C, D, by its ramifications. If only C is physiologically connected with A, both having the same chronaxie, the impulses coming from A will pass through C and not through B or D.

higher in the special sensory tracts, particularly in the optical, than in the general sensory tracts and also higher in the latter than in the motor tracts, the functioning of the whole nervous system depending entirely on the law of resonance.

On the other hand, it is actually admitted, too, that



"the nerve cells possess the property of modifying the rhythm they receive, so that the impulses which they in turn transmit to the peripheral organs are produced in accordance with rhythms of their own" (6). As there are differences in the vibratory rate among the neu-

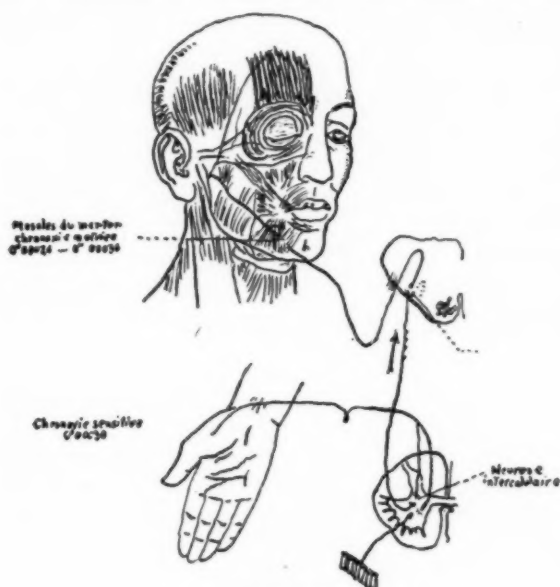


FIGURE III

Palmo-mentonian reflex (G. Marinesco and A. Radovici)

Sensory motor isochronism of both afferent and efferent parts of the reflex arch. A cutaneous stimulation on the thenar region causes a slow and durable contraction of the mentonian muscles of the same side because the neurons involved have practically the same chronaxie.

(From A. Radovici, *Etudes sur la Circulation de l'Influx Nerveux dans l'Arc Réflexe*, Paris, 1927.)

rones, one easily conceives what the heterogeneity of their functions should be. "Like muscles, nerve cells have a refractory period and obey the same law of summation. Electrical stimulations on the motor zone of the cerebral cortex are inefficient unless they are separated from each other at least by one-tenth of a second. It is of great importance to connect this fact with that of the fusion of the sensorial impressions and also to the relative speed of voluntary movements. It is well known that one cannot obtain any muscular response with more than 9, 10, 11 or at the most 12 motor oscillations per second, and that the retinal impressions begin to lose their independence as soon as the stimuli are separated by intervals of less than one-tenth of a second" (7).

From this may be readily inferred that the vibration rate of nerve cells, just referred to, should be spoken of only in the case of motor neurones. For the fact that the latter can not react to more than ten stimulations per second does not necessarily mean that the neurones which take part in the intracerebral operations preceding the motor responses should have the same rate. It seems on the contrary that the rate of the cerebral cells is reduced considerably at the moment of the conversion of their energy into motor impulses, for the sake of the latter's transmission through the efferent tract with a speed proportional to that of the transmission of the afferent impulses through the sensory paths. This fact is analogous to that of the previous reduction in the sensory end-organs of the different velocities of the diverse external stimuli. The motor neurones would operate, therefore, as low tension transformers, contrary to the action attributed to the sensory and to the associative neurones, that is, to stir up again stimuli

which were slowed down during their passage through the afferent paths.

In this way, one now may realize that nerve-cells *do* enjoy the property of modifying the rhythm of the stimuli they receive, and that the impulses originated in them should have a rhythm of their own. It is then inevitable to infer that if a certain group of encephalic motor neurones should receive higher rated stimuli than those representing their reducing power, exaggerated muscular responses will necessarily follow.

This seems to be the case. It has been actually demonstrated that the excessive duration of the lapses of voluntary attention, occupied, as I have discussed in another place (8), by high pitched vibrations, may become a copious source of functional troubles. In these troubles, the initial phenomenon is constantly a more or less durable or recurrent hypertonic condition, somewhere in the striated muscular system. A test recently introduced in American physiology (I refer to the *hyperpnea test*) is a fair proof of that assertion. During the test the conscious retardation of the respiratory rhythm causes peculiar phenomena of tetany, which are useful for the differential diagnosis between the organic and the merely functional hypertonic conditions, (9). The importance of such clinical and experimental facts is unquestionable, not only from the point of view of both the pathogenesis and the therapeutics of many disturbances, but from that of their own prophylaxis, if sound practical application is made of them. They fully confirm that in the voluntary realm, just as in the vegetative, the preservation of physiological rhythms is the secret of general muscular relaxation.

With these facts in mind it can be satisfactorily explained how a more or less intense disturbance of such rhythmicity produces and maintains all abnormal conditions having as a common feature a certain degree of motor incoördination.

The following conclusion is then justified:

Behind the apparent variability or irregularity in the succession of our voluntary movements, there exists a strict obedience to the intrinsic rhythm of the muscles or groups of muscles involved in each movement. Any cause of discordance will jeopardize the accuracy in the performance of voluntary reactions.

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#### Premalignant Disease of the Rectum

Hemorrhoids, fissures, and anal fistulae do not often result in cancer. This is probably true of chronic severe inflammation of the sigmoid and return when not associated with multiple adenomas.

After investigating a series of adenomas of the sigmoid and rectum, I believe the following conclusions may be made:

1. The larger adenoma, two centimeters or more in diameter, is generally but not invariably carcinomatous, and the carcinomatous adenoma is usually single and generally of a red, meaty appearance.
2. The percentage of multiple adenomas which undergo malignant change is high.
3. Adenomas of the rectum and sigmoid have a gradation toward malignancy and when they undergo malignant change they become low-grade carcinomas.—Clement C. Martin, *Illinois Medical Journal*, August 1929.

# The Measurement of Chronaxie

## Demonstration of Clinical Apparatus

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The concept of chronaxie, introduced by Lapicque, is an electrical time-coefficient of neuro-muscular excitability, defined as the minimal duration during which a current must pass through a muscle or nerve in order to elicit from it a liminal response. This definition differs from the historic view as regards neuro-muscular excitability in two important respects: First, it asserts that the duration of a current as well as its intensity determines its effectiveness as an exciting stimulus; second, that the minimal time required for the excitation of a particular nerve (under certain conditions) is a constant characteristic of its excitability.

The historic view which originated with Du Bois Reymond and continued for almost a half century was that the excitability of a muscle or nerve was exclusively a function of the intensity of the stimulating current and altogether independent of its duration. This was based upon the erroneous and unchallenged observation that curtailment of the time of passage of a current had no influence upon its effectiveness. The negative observation, however, had been due to the insufficiency of the instrumentation employed, which did not permit the early investigators to reduce the time of the passage of the current to a sufficiently short duration. This was finally achieved in an indirect way by the Dutch physiologist Hoorveg (1892) in a study of the excitability of the motor points of human subjects, by the use of condensers.

In this study he showed that the voltage required for effective stimulation of a muscle through its motor point varied inversely as the capacity of the condenser employed. Since the time of discharge of a condenser is a function of its capacity, Hoorveg thus demonstrated that the duration of the passage of a current is not without significance.

Weiss (1901), taking up these experiments and substituting directly measured durations instead of condenser discharges, verified the work of Hoorveg and established what has since become known as the law of Weiss, namely, that the liminal intensity required for the excitation of a muscle or nerve diminished as the time of passage of a current increased up to a certain minimal point, beyond which the increase in its duration has no further perceptible effect. The relation was expressed by him as follows:

$$i.t = A + b.t, \text{ where}$$

$t$  is the time of passage of the liminal current,  $i$  the intensity of the current, and  $a$  and  $b$  two experimental constants which depend on the particular tissue excited and the conditions of the experiment— $a$  being a quantity ( $Q$ ) and  $b$  an intensity ( $I$ ).

Lapicque's contributions were essentially threefold. First, he showed that the generalization of Weiss held (approximately) for all muscle and nerve; secondly,

that the relation of  $\frac{a}{b}$  suggested by Weiss as a possible

characteristic of irritability was in effect the only constant which characterized neuro-muscular excitability; and, thirdly, he furnished a method by which this characteristic—or chronaxie, as he termed it—could be reliably determined.

These contributions have proved of momentous im-

portance and have opened up a new vista of physiological research and discovery. Two are of particular significance; the first and more general one is that the chronaxie of a muscle or nerve is closely related to its functional activity. There is an inverse relation between the speed of a muscular contraction and its chronaxie, as is, for instance, illustrated by the following examples (given by Lapicque):

Muscle	Chronaxie (time in seconds)	Duration of contraction
Gastrocnemius (frog)	0.0003	0.15-0.20
Claw of crab	0.0030	5
Stomach of frog	0.0100	15-20

The general rule seems to be: Short chronaxie—quick response; long chronaxie—slow response.

The second is that those factors which alter the physiological function of a nerve or muscle also alter its chronaxie; for instance, temperature, fatigue, degeneration, action of drugs. Thus, cooling or fatigue lengthens a muscle's chronaxie; increase of temperature and veratrin shortens it. When a nerve degenerates, its chronaxie is lengthened; as it regenerates, it tends to return to its normal value, etc., etc.

The measurement of chronaxie in human subjects, as indicated by Lapicque and perfected by Bourguignon, is effected by the use of condensers. This procedure involves two essential steps.

(1) The first is to obtain a liminal response (contraction) of the muscle examined. This is done in a way similar to the method employed in monopolar exploration. One determines the minimal voltage required with a make of galvanic current, using the negative pole as a stimulating electrode. This is the rheobase of Lapicque.

(2) With a current twice this voltage, the experimenter successively charges and then discharges a series of condensers, using the same points of stimulation. The capacity just sufficient to produce a contraction equal to that obtained with a rheobasic voltage gives the chronaxie sought for (demonstration).

The measurement of chronaxie, which is a time dimension, by the use of condensers depends upon the fact that the rate of discharge of a condenser is a function of its capacity and the resistance of the circuit across which it is discharged, being proportional to its product  $RC$ . If then the capacity is to be the measured variable, the resistance must be kept constant. It happens, however, that the resistance of a tissue—and in particular that of the body—varies from subject to subject and with the conditions of the experiment (temperature, size of electrodes, and other features). Hence, a method must first be found to eliminate or to compensate for these causes or variability. This is achieved by introducing with the subject, in series and in parallel, a large fixed resistance, such that the subject's individual variation becomes negligible with regard to the total resistance of the circuit. The resistance ( $R$ ) of the circuit being approximately constant, the chronaxie-time ( $t$ ) may be calculated as follows:

$$t = RC \times K$$

where  $C$  is the capacity used to give the liminal contraction with twice the rheobasic voltage and  $K$ , the experimental constant, obtained by comparing the condenser discharge with direct rheobasic measurements. This can



be done once for all and was found by Professor Lapique to be 0.37. The formula then becomes  $t = RC \times 0.37$ ;  $R$  being known,  $t$  may be calculated by multiplying  $C$  by a constant ratio. Thus in Bourguignon's circuit for the measurement of chronaxie in man (which is the one employed in the speaker's new clinical apparatus)  $R$ , the mean reduced resistance, is 11,000 ohms: whence

$$t = C_i \times 11,000 \times 0.37,$$

and expressing  $C_i$  in microfarads

$$t = 11,000 \times 0.000001 \text{ (mf.)} \times 0.37 = .004,$$

that is to say, when the resistance of the circuit is 11,000 ohms  $t = Ct \times .004$  where  $t$  = chronaxie in seconds, and  $C_i$  capacities in microfarads.

#### NORMAL VARIATIONS IN CHRONAXIE:

The fundamental contribution of Lapique to the problem of neuro-muscular excitability of a muscle or nerve was a constant which characterized its excitability and correlated with its functional activity. Different muscles in the same organisms or homologous in different organisms have their characteristic chronaxies. Bourguignon verified this for the human body and has now been able to show by extensive investigation of almost the entire skeletal system that the chronaxies of these muscles classify them into various groups according to their synergic function.

#### PATHOLOGICAL VARIATIONS:

Studies of chronaxie in neuro-muscular pathology show that variations of chronaxie are correlated with physiological function and not anatomical structure. There is no differentiation between lesions to the nerve (e. g., Wallerian degeneration) and the muscle itself (e. g., Thomsen's disease). In general, chronaxie is linked with the form and duration of the muscular contraction. Alterations in chronaxie due to pathological conditions may vary from two to three, to several hundred times that of the normal muscle and nerve. In the case of degeneration, the alterations in chronaxie vary with the degree or extent (number of fibres involved) of the lesion. It is possible to define the degree of degeneration and, when recovery sets in, the degree of regeneration from the relation existing between the muscle's or nerve's normal and pathological chronaxie. And the great value of chronaxie measurement as an electrodiagnostic method is that not only can these degrees of degeneration or regeneration be detected with far greater precision than with the older methods, but at a considerably earlier period. Its difficulty as a method has been greatly exaggerated. With the portable apparatus devised by the author it is no more difficult to obtain a chronaxie measure than to test a nerve with any of the older clinical methods.

(Demonstration of Apparatus)

## Electrodiagnosis by the Faradic-Galvanic and Condenser Test

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Electrodiagnosis deals with the reactions of muscles and motor nerves to electrical stimuli. It furnishes a valuable aid from the standpoint of diagnosis, prognosis and therapy in pathological conditions of the motor tract, including the brain, the spinal cord and the peripheral nerves, and of the muscles. The principles of electrodiagnosis were discovered by a Frenchman, Duchenne of Boulogne, eighty years ago, and were further developed by French and German clinicians, such as Erb, Remak, Pflüger, duBois Reymond, Babinski, until the classical method of testing by the faradic and galvanic current was fully established. During recent years French and English investigators, Lewis Jones, and later Lapique, Bourguignon and Adrian, have developed newer methods of more precision. One of these is the testing by condenser discharges, using electrical impulses of uniform strength; the other is the determination of the chronaxie or the weakest current which without regard to its duration will produce the faintest perceptible contraction.

The technic and significance of electrodiagnosis ought to be known to every practitioner of medicine who has occasion to examine and to treat nerve injuries and lesions of the central and peripheral nervous system. A physician skilled in electrical testing of muscles and nerves can testify as an expert and, if necessary, demonstrate his findings in court in the now so numerous cases of paralysis, real and simulated, following industrial and other accidents. Turrell states: "The special value of the electrical tests is that they afford objective evidence in place of the subjective signs afforded by the other methods of observation. We may suspect,

from the appearance of the skin and from the tone of the muscles, that the loss of voluntary power in a limb is only functional; but a very brief examination of the muscles of this limb by the faradic current will definitely prove to us, if the muscles contract, that the case is a functional one, and if no contraction is elicited that there is an organic nerve lesion.

Because of these exacting demands as to knowledge and technic, methods of electrodiagnosis are not as often used as they should be—the average neurologist and neurosurgeon not having been taught enough about electricity and the average electrotherapist having not enough clinical training in neurology. It is to be expected that clinical team work in modern departments of physical therapy will overcome this state of affairs and that in the future electrodiagnosis will be used as a routine in the numerous conditions in which it is of aid in diagnosis, prognosis, and in the institution of appropriate therapy.

*Principle of electrical testing.* A suitable electrical stimulus applied to a motor nerve elicits a contraction in all of the muscles supplied by the nerve below the point of stimulation. A suitable electrical stimulus applied to a muscle elicits a contraction of the muscle itself and may also spread to the neighboring muscles. The character of the response varies with the nature and strength of the stimulus employed and the normal or pathological state of the nerve or muscle. It may be normal, it may be exaggerated, it may be diminished, or may be changed in character and it may be entirely absent. Lack of any response to either muscle or nerve stimulation proves that there is neither conductive nerve tissue nor contractive muscle tissue present. This occurs only in the later

stages of peripheral nerve injuries or poliomyelitis or in progressive muscular atrophy.

**Motor points.** Strong electric stimuli applied to any muscular part of the body will cause disagreeable shocks and muscular jerks in a widespread area. In contrast to this, muscle and nerve testing is a delicate and relatively painless procedure which elicits a well localized muscular response with a minimum amount of current. Every nerve and every muscle, unless deeply covered by other muscles, possesses a small area where it is most easily excitable and where a visible contraction can be elicited with a minimal amount of stimulation. This area is called the *motor point*. The motor point of a normal muscle is located usually about the middle of the muscle belly, where the motor nerve enters the muscle. In a nerve trunk the motor point can be found where the position of the nerve is nearest to the skin and consequently its shape is somewhat linear, and there may be several points of maximal irritability in the long course of a nerve.

The topography of motor points was first studied by Erb, and almost all of the diagrams showing their locations are reproductions of Erb's original charts. A set of such diagrams is an indispensable part of the equipment of the beginner; those doing electrical testing frequently should learn by practical experience the approximate location of the motor points. It must be remembered, however, that even within normal limits there are individual differences in the location of the motor points and also in their sensitiveness. In pathological conditions leading to a reaction of degeneration, the motor points in muscles are displaced distally, and at the same time the motor point of the nerve disappears entirely.

### 1. The Faradic and Galvanic Test

**Apparatus.** The apparatus for the classical method of testing by the faradic and galvanic current consists of the following:

(1) A faradic coil which must be activated by a source of galvanic (direct) current, either from the DC house supply, from batteries or from a motor generator.

(2) A galvanic apparatus, equipped with (a) a rheostat for regulating the strength of the current; (b) a milliamperemeter—mounted in series—to measure it. In some instances the additional use of a voltmeter—mounted in parallel or shunt—may be desirable.

Simple galvanic-faradic outfits are on the market in the form of portable boxes, with dry cells. These outfits deliver a smooth and consequently more painless form of galvanic current than wall plates or generators operating on the house current. Some types of modern low tension wave apparatus furnish a battery current suitable for testing and for treatment, although they fail to provide a faradic coil.

**Technic.** Everyone interested in electrodiagnosis will best acquire a practical working knowledge by first testing under normal conditions and thus learning to appreciate the range of normal variations. It is well to start on a muscle or nerve which is easily located and the response of which can easily be seen, such as the biceps of the arm. A suitable routine for making an electrical examination would be as follows:

(1) The room must be well lighted so that the slightest contractions of muscles can be observed, and warm so as to avoid chilling of the patient.

(2) The patient and the doctor should be placed in a comfortable position so as to avoid undue fatigue. The operator should be able to reach all parts of the apparatus without changing his position. For testing the upper extremity, neck, shoulder and face, the patient may be seated by a little table, resting his extremity on

it, with the examiner sitting opposite; for the examination of the lower extremity, back and lateral region, the patient should lie on a table, either in prone or supine position. Such supported position will relax the muscles to be tested.

(3) The area to be examined should be exposed for ten or fifteen minutes to the rays of a luminous heat or infra-red applicator or be covered for the same period by a hot wet towel, in order to decrease skin resistance. This will also minimize the painfulness of testing. Electrodes must be well moistened by soaking in hot water to which a pinch of table salt has been added. This very small amount is sufficient to improve the conductivity of the water. Too much salt adds to the electrolytic process under the electrodes and consequently to the painfulness of stimulation. A small basin of hot salt water should be conveniently on hand and the testing electrode should be frequently soaked in it following its preliminary moistening.

(4) The position of the two electrodes should be as follows: The dispersing electrode may be placed over any part of the body which contains little muscular tissue. For testing the upper extremities, the chest or middle of the neck or the back may be convenient; for testing the lower extremities, the sacrum or the small of the back will do. The dispersing electrode must be held in good contact by the weight of the patient, a small sandbag, or a suitable bandaging. The testing or active electrode is placed in good contact directly over each motor point to be tested. This technic of testing is called the *unipolar* technic and serves as the routine method. In exceptional cases when the muscles are very weak and the testing current tends to spread and to cause contractions in neighboring muscles, the *bipolar* technic may be tried. This consists of applying two active electrodes, each of about one-half inch size, directly over the belly of the muscle to be tested. This allows more current concentration over the affected area and considerable reduction of skin resistance, and avoids spreading of excess current to surrounding muscle groups. A combination of these two technics can also be used, as for instance in testing the intrinsic muscles of the hand, the dispersing electrode is placed under the palm and the testing one over the interossei on the back of the hand.

**The faradic test.** Connect properly placed dispersing electrode to one binding post of a faradic coil—it makes no difference to which post—and active electrode to the other. Apply active electrode, well moistened, in good contact, over the motor point of the muscle or nerve to be tested. Turn on the current (one hears humming of vibrating armature and sees a fine sparking at point of contact), advance secondary coil to a moderate distance—about 2-3 cm. of the scale, then press key of interrupting device and start current flow. The subject will feel stinging under the testing electrode and if the current strength is sufficient and the electrode is in the right position a tetanic contraction of the muscle or group of muscles (if the nerve is tested) occurs. This contraction will persist while the current flows.

In routine testing, normal faradic response usually obviates the necessity of a galvanic test. If there is more than the average amount of current needed to get a response (compare with the well side) note the position of the secondary coil on the scale.

**The galvanic test.** Connect dispersing electrode to positive pole (it is customary to use red cord) and testing electrode to negative terminal (use green cord) of galvanic supply. Place testing electrode over motor point. Advance rheostat slowly, increasing strength of current from zero upward. By pressing key down from time

to time watch for the first visible contraction. With a little practice one ought to learn to find the threshold of excitation, i. e., the minimum amount of current (usually 2 to 3 MA) that causes a contraction at the "make" of the current.

**The polar formula.** In older textbooks, great stress is laid on the difference of response following stimulation from the two poles. The order in which contractions appears in normal muscles is presented as K.C.C. > A.C.C. > A.O.C. > K.O.C., signifying that cathodal closing (the make of the current with the negative pole) excites contraction with the least amount of current; and more current is needed for the anodal opening, and finally for the cathodal closing contracture. It is the consensus of opinion of modern investigators that at the make of the current a chemical stimulation occurs chiefly at the negative pole, and at the break of the current at the positive pole, and therefore it is generally accepted now that at the *make* (closing) of the current the negative pole alone is active and at the *break* (opening) of the current the positive pole is the only active one. In the now generally followed testing practice we disregard the polar formula entirely and test always and only with the negative pole as the active terminal and using the stimulus of the make of the current.

**Why are two currents necessary for testing?** The fact that two kinds of current are used for testing is somewhat bewildering for the beginner. The faradic current furnishes a series of rapidly recurring stimuli, each rising to a maximum in about 1/1000 of a second and recurring about 100 times in a second. The rapid recurrence of these stimuli keeps a normal muscle in tetanic contraction during the entire time of flow, thus making observation of the response very easy. The galvanic current, while flowing steadily, furnishes no stimulus for muscular contraction; only when its flow is suddenly started (made) at sufficient strength or is interrupted (broken) while flowing at sufficient strength does a muscular response occur. These contractions are single contractions, and it has been estimated that the impulse of the make and break of the galvanic current lasts about one-half second. We have thus for ordinary testing a stimulus of very brief duration (the faradic current) and one of relatively long duration (the make of the galvanic current). Normal muscle and nerve respond to both of these equally well, but once the nerve supply is damaged the muscle will not respond to the brief faradic current, but still responds to the longer impulse of the galvanic current.

#### Abnormal Electrical Reactions

The following table shows the summary of reactions in abnormal conditions.

##### DIAGNOSTIC SIGNIFICANCE OF CHANGES IN ELECTRICAL REACTIONS

Increased response	Recent hemiplegia, first days of nerve injuries, tetany, spasmophilia, chorea, initial stages of spinal cord diseases.
Decreased response	Advanced hemiplegia, tabes, paralysis agitans, later stages of spinal cord diseases, muscle atrophy due to disuse in arthritis, myositis, mechanical conditions, young children.
<b>Brain</b>	
	Lesion of bulbar nucleus Compression of intracranial nerve trunks.
	Labio-glosso-pharyngeal paralysis, softening of centers, tumors, hemorrhage of centers.
<b>Spinal Cord</b>	
	Lesions of anterior horns
	Acute: Infantile paralysis, acute anterior poliomyelitis of adults. Subacute: Lateral amyotrophic sclerosis. Chronic: Chronic poliomyelitis
Reaction of Degeneration (full or partial)	Lesions of cord including anterior horns. Compression of nerve trunks in spinal canal or in spinal origin.
	Syringomyelia, hematomyelia. Pachymeningitis, tumors, fractures, dislocations.

##### Peripheral Nerve Trunks

Traumatic lesions.	Section, compression, elongation, concussion.
Toxic neuritis.	Alcohol, lead, diabetes, local infections.
Infectious neuritis.	Typhoid, syphilis, influenza, tuberculosis, polyneuritis.
Neuritis from exposure.	Facial paralysis, musculo-spiral paralysis.
Absolute RD (no response at all)	End stages of progressive muscle atrophy. Long standing peripheral nerve injuries or old poliomyelitis

**Increased excitability** to both faradic and galvanic stimulation is of little diagnostic value except that its presence might help in a differential diagnosis between tetanus and hysterical spasms—in the latter a decreased excitability is the rule.

**Diminished excitability** occurs especially in muscular lesions following continued inactivity; in such event, clinically there appear atrophy, decrease of muscular power and decrease of the reflexes. Prolonged immobilization after fractures or joint affections is a frequent cause for electrical hypo-excitability, such as shown in the atrophy of the deltoid after shoulder lesions and that of the quadriceps following injuries to the knee. Electrical testing helps to differentiate this condition from the atrophy following real neuritis, because in the latter reaction of degeneration is present. The practical importance of these differences lies in the determination of the appropriate method of treatment. In simple muscular atrophy, as signified by simple hypo-excitability, rhythmic electrical stimulation by the surging faradic or sinusoidal current usually results in prompt improvement.

**The reaction of degeneration.** The reaction of degeneration is characteristic of lesions of the lower motor neuron which cause neuromuscular degenerations; it consists of definite changes in the character of the electrical response and the strength of the current necessary to elicit them.

##### Total or full reaction of degeneration.

- The nerve does not respond to either faradic or galvanic stimulation.
1. The muscle after a period of hyperexcitability does not respond to faradic stimulation.
2. The muscle responds to galvanic stimulation but demands a greater current strength.
3. The response of the muscle to galvanic stimulation is *sluggish and slow*.
4. The motor point is displaced towards the periphery, where the muscle fibers join the tendon (longitudinal reaction).
5. The formula of polar response often changes, i. e., stimulation from the positive pole elicits an equally prompt or often better response than from the negative pole. This change, however, is not constant and for this reason it is the opinion of modern investigators that the polar inversion should be disregarded.

##### Partial reaction of degeneration.

- The nerve shows a decrease of both faradic and galvanic response.
- The muscle shows:
  1. Decrease of faradic excitability.
  2. Increase of galvanic excitability (this is irregular, most frequently observed in facial muscles).
  3. The response is slow, but this not as pronounced as in full RD.
  4. There may be longitudinal reaction and inversion of polar formula.

There may be all forms of transition existent between full and partial reaction of degeneration, both in quality and quantity of response and partial RD may develop.



into full RD, or both may simultaneously exist not only in the same extremity but also in the same group of muscles.

**Absolute RD.** This term, suggested by Turrell, is applicable to cases in which there is absolutely no response to any current in either nerve and muscle. Such cases represent the final stage of a previous full RD with an unfavorable outcome. It must be made certain always that testing conditions are correct, and it may be better to repeat a test at least once before a definite verdict of hopelessness for the return of function is rendered.

**Significance of the RD.** The occurrence of the reaction of degeneration signifies a separation—anatomical or physiological—between a muscle and its trophic center.

The presence of a full RD permits us to state that the seat of a lesion accompanied by paralysis is in the lower motor neuron, the anterior horn roots or in the peripheral nerve. It does not permit any further distinction as to nearer location. It also denotes the severity of a lesion, and the fact that it is an organic one because of the marked pathological changes upon which it is based. It has no relation whatever to the etiology of the lesion, because trauma as well as inflammations and new growths can equally be active in causing a condition resulting in RD. It indicates, however, changes in nerve and muscle substance that will take considerable time—months at least—for recovery. *The finding of an RD by no means indicates an irreparable damage.* It is only a stage of a reaction and not a permanent phenomenon, because the lesion may gradually improve and full restoration may occur; if on the other hand the lesion of the lower neuron is not arrested, the muscles become fully atrophied and absolute RD follows, with loss of all response to either faradic or galvanic stimulation.

The presence of a partial reaction of degeneration shows probably that slight changes have occurred only in the terminal muscular branches of the nerves, while the large nerve trunks have remained approximately normal. The latter have therefore retained their electrical excitability while the terminal branches of the nerves have lost it. The partial reaction of degeneration therefore always permits a more favorable prognosis in regard to time of recovery than the complete reaction of degeneration, but it also indicates the necessity of continued observation and the repeating of the electrical tests. From the absence of reaction of degeneration we can draw the conclusion with certainty that no coarse anatomical changes are present in the nerve, and that we may expect a much more rapid recovery from the trouble, perhaps in three or four weeks.

Functional, hysterical paralyses and paralyses of cerebral origin are never accompanied by important disturbances of the electrical reactions. At most, there is slight electrical hyperexcitability, while in the later stages there is usually hypoexcitability from muscular atrophy. Therefore, the absence of RD may serve as important evidence in determining malingering or functional paralysis, and differentiating them from other conditions.

The prognosis based on correct electrical testing is of especial value in the rather frequent types of paralysis, such as facial paralysis following exposure or "idiopathic" cause, in paralysis of extremities due to pressure or exposure (wrist drop after sleeping with arm under head), and in many types of infantile paralysis. In these conditions, when tested about ten days after their onset we are able to differentiate light, moderately severe, and severe cases. When there is no RD, there is usually recovery in two to four weeks; if there is partial RD present, recovery may take six to twelve months. In organic spinal affections, as well as in peripheral neuritis due to intoxications, no definite prog-

noses can be made on the basis of partial or even full RD alone because it may represent only a transitional stage in an otherwise progressive and incurable condition.

We must emphasize that, while the presence of an RD may be a deciding factor in diagnosis, it is not infallible. It must be always considered in conjunction with other clinical evidence.

## 2. The Condenser Method of Testing

The classical method of faradic and galvanic testing is most important for the recognition of gross changes in the electrical response of peripheral nerves and muscles. But when it comes to exact measurements of degree of change and to the use of definite figures instead of subjective observations for the measuring of progress or further degeneration, the insufficiency of the simple faradic and galvanic test at once becomes evident. The strength of the ordinary faradic current is not measurable at all, and the length of each impulse not only varies in different coils but even in the same coil. Faradic response, moreover, has no prognostic value because in a paralyzed muscle voluntary power returns as a rule before the response to faradism. The strength of the galvanic current can be measured, but its duration of flow cannot be measured. Both the faradic and galvanic tests are often painful because, as a rule, the currents used for testing are much too strong and last much too long.

Among the number of new and more accurate nerve and muscle tests, the condenser method of testing introduced by Lewis Jones came into practical use during the late war with its great number of nerve injuries. The principle of the condenser set testing depends on the fact that the discharge of a condenser through a constant resistance varies in duration according to the capacity of the condenser. The discharge starts at its maximum value and falls off gradually, and with the sets of condensers in use it is possible to obtain currents whose total duration varies from 1/24,000 of a second to 1/200 of a second. To visualize the working of a condenser set, one can aptly compare it with a set of springs of gradually increasing size kept at even tension. As each spring is released it will oscillate according to its length and furnish an impulse, the duration of which will depend on the length of the spring. Thus the largest spring, representing the largest condenser capacity, will furnish the longest duration of stimulation. With these currents it was found that the more severe the injury to the nerve appears to be, the greater is the capacity of the condenser, and, therefore, the longer is the duration of the discharge required to excite the muscle. Thus, this method would seem to give all the information which could be desired from the clinical point of view; we have only to find the least capacity of the condenser which will excite the muscle and this will give a measure of the severity of the injury. Instead of a long description of the type of response, a simply numerical equation was available and served as a basis for future comparison. No wonder that such a simple method created interest and was put to extensive use when there were so many nerve injuries to diagnose and follow up.

The technic of condenser testing is similar to that of the ordinary galvanic test. A large dispersing electrode connected to the positive terminal is placed over a remote part of the body and a small 3/4-inch wet disc electrode connected to the negative terminal is placed exactly over the motor point to be tested. The lowest condenser is brought in circuit through its switch and is then discharged through the discharge switch of the apparatus, working like a telegraph key. If no visible

contraction follows, another microfarad capacity is added and so on, until enough capacity is combined to obtain a response.

Having used the condenser method of testing for the past eight years as a routine measure at the Reconstruction Hospital, I can corroborate the findings of other investigators that it is a distinct forward step towards establishing a method capable of giving quantitative measurements. Its *advantages* are: (1) It provides a method of precision to chart the degree of excitability of individual muscles, and enables definite measuring of progress. (2) It is usually more painless than the ordinary faradic and galvanic test, as especially shown in most cases of infantile paralysis. Its *disadvantages* are, that: (1) It takes considerably more time than the ordinary methods of testing. (2) It often elicits no response at all in event of full RD and thus used alone would be misleading. It became a routine with us to use the ordinary galvanic testing in all cases in which there was no response with the condenser set. In many

of these, the strong galvanic impulses brought about a contraction. (3) It has in some cases an unpleasant tendency (in employing the larger condenser capacities) to spread to antagonistic muscles in the vicinity. This contraction naturally interferes with the response of the paralyzed group and can only be partially overcome by the use of the bipolar method of testing.

On account of these drawbacks condenser testing has not come into extended use and no new condenser testing apparatus is being manufactured now; still, in the hands of experts, condenser testing has considerable value in prognosis and in the accurate follow up of nerve injuries.

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223 East 68th Street.

## Brachial Plexus Injury Treated by Electrotherapy

RICHARD KOVACS, M.D.

New York

The patient, a young man of 19 years, went sleigh-riding in Central Park three and a half years ago, in November, 1926. The sleigh was struck by an automobile and he was thrown out forcibly, picked up unconscious, and brought to the Reconstruction Hospital. He then had complete paralysis of the right arm and hand, and an evident swelling in the right infra- and supra-clavicular region; there was also definite anesthesia over arm and hand to about the region of the insertion of the deltoid muscle. X-ray examination was negative for suspected fracture of the clavicle. Electrical tests taken a week after the accident showed full reaction of degeneration of all the muscles supplied by the supra-scapular circumflex and musculo-spiral nerves, and a weak response in the median and ulnar distribution. The conclusion was that these findings were due to hematoma or laceration of the posterior cord of the brachial plexus. There was some discussion by the staff as to whether the patient was to be operated upon; it was decided that no exploration of the plexus should be made but that he would do better under observation and physical therapy.

Accordingly he was given prolonged applications of luminous heat, mild massage, and support of the arm; and, later, diathermy from the shoulder to the arm, and interrupted slow sinusoidal to all paralyzed muscles. There was gradual but slow improvement from the beginning. Four weeks later he showed a fairly good response of all the shoulder muscles, with the exception of the deltoid which still showed R.D. The median area cleared but the ulnar area seemed somewhat more affected. Subsequently there was marked atrophy of all affected muscles, but under treatment the electrical responses improved right along. Three months later there was return of normal type of response in deltoid and supraspinatus. In May, six months later, it was decided to make an explanatory operation of the plexus. Some scarring was found about the plexus but no lacerations, proving that the suspension of function was simply due to the hematoma and pressure. There was no marked change in the condition immediately following the operation. The gradual improvement under

physical therapy continued, and he was put to work in the occupational therapy department.

In July, 1928, a little less than two years later, all the muscles and nerves showed normal voluntary and clinical response; there was still marked atrophy, but under continued treatment and activity this finally receded also, and at present he has complete restoration of function of the right upper extremity, as you can see for yourselves.

#### Discussion

DR. HARRY STEWART (New Haven, Conn.): These papers and demonstrations have been very interesting and instructive. We have had the physics of muscle reaction and the clinical aspects of it. The first two papers have led us rather deeply into the science side but were very illuminating. Dr. Kovacs has given us a few interesting and practical points. If you will bear with me, I will give you one or two of the A B C's, but first I will congratulate him on his work. I was rather interested in his getting the reaction of degeneration in eight days. We have always found that it began to appear in seven or eight days, and was complete only in three weeks.

I have brought this practical problem before the pupils: Suppose a man with a large family to support has an injury on Monday, and on Friday the agent comes to him and says "if you will sign on the dotted line, we will give you so much"—should he accept? He should not, for it may be fully three weeks before we can tell what has happened. It is like a group of cut flowers in a vase. They look real and as if they were growing; it is not until they begin to dry and droop that you realize they are cut flowers. So with the nerve; it takes a certain time until degeneration reaches the point of faradic inexcitability. We owe quite a little to Dr. Kovacs for showing that there is still something worth while in the condenser test.

Occasionally we find a case in which there is no galvanic response. It shows that fibrosis has gone on to such a point that treatment is useless. The pendulum often swings from too great trust in a test to too little; and if these reports show that we can place some reliance on galvanic test prognosis, they are of value. The point that he brought out—that active motion returns before Faradic excitability, is perfectly true. The paper adds a great deal to our knowledge on the subject.

DR. A. B. HIRSCH: My interest in this subject has been of some years' standing. About ten years ago, in army days, in the Walter Reed Hospital, muscle and nerve testing was part of my duties there. At that time I wrote an illustrated paper covering a variety of such tests, including chronaxie, this being among the earlier descriptions of it in English, so far as I could

learn at the time. Tinel's book on muscle and nerve injuries described chronaxie in some detail, and was among the earlier ones in English to attach importance to this method of testing. Unfortunately, we did not then have the mechanical facilities to apply the chronaxie test.

Last year I spent an interesting day at Hôpital Salpêtrière in Bourguignon's clinic with his assistants, engaged in making mechanical tests. At that time it surprised me to note the seemingly cumbersome apparatus required for the purpose. My object in going there was to ascertain how long it would take to be trained in the use of the necessary apparatus, and I was informed by an English-speaking physician then taking the course that thorough training by himself had occupied about a year of instruction. So my own feeling about the matter has been pretty well expressed by Dr. Kovacs—that in its present stage chronaxie would be best applied in laboratory work and be less likely to find favor with clinicians for use in routine practice.

DR. L. T. LE WALD: I was very much interested in Dr. Kovacs' presentation of the case of the young man, and I wonder if he could explain the mechanism by which the nerves were injured—whether by stretching, or by injury to the spinal cord. I saw a somewhat similar case recently, in which a woman, driving an automobile on Long Island about three months ago, ran into a train and was forcibly thrown upward through the roof of the car. At first there was very little evidence of nerve injury, but gradually the shoulder became relaxed, very much as one sees in so-called birth palsy, and she was sent to me for X-ray examination. She had had two previous X-ray examinations and nothing discovered. Two months after the injury she had a definite paralysis of the arm, and later there has been a partial subluxation of the shoulder joint. I made a lateral X-ray examination of the cervical portion of the spine in the vertical position and found a dislocation of the 6th on the 7th cervical vertebra with the deduction that pressure on the spinal cord produced the nerve injury involving the arm and shoulder. Dr. Byron Stookey confirmed my diagnosis. In Dr. Kovacs' case I can see where an injury to the cord might have occurred as a result of a partial dislocation which had slipped back after injuring the cord. But as he states a direct injury to the brachial plexus appeared to account for the condition. It is a very interesting case and a splendid result.

DR. WECHSLER: I do not know why there should be such apprehension as regards the difficulty of the chronaxie technique, because this difficulty has always been insisted on only by those who have never employed the technique. It seems that some of you who saw Dr. Bourguignon's somewhat elaborate and electrodiagnostic table were a little overawed by the display of wires and measuring instruments. I can assure you, however, that if the ordinary wall apparatus for obtaining galvanic and faradic reactions were exposed instead of being concealed in a neat box, it would appear equally complicated. The actual technique of obtaining a chronaxie measurement, once you have the necessary set up, is no more difficult than that of obtaining any other accurate electrodiagnostic measure, as you can readily see from very simple manipulations involved on the apparatus which you see before you (Dr. W. demonstrates). The delays are not due to the complexity of the manipulations, but to the time required to locate the motor point and observing the contractions, which obtains equally when testing with any other method. The manipulations themselves take as you see but a minute, and any intelligent person can learn them in less than five, although of course that does not mean that he thereby understands the physics of the process, any more than his ability to tune in on the radio implies a knowledge of the electro-dynamics of the vacuum tube.

With regard to Dr. Kovacs' method of direct use of condensers, without taking into cognizance either the varying resistance of the subject or the question of liminal current, I can only say that it is absolutely incorrect in theory and cannot but give unsatisfactory results in practice. The fact that he was able to report differences in muscle reactivity, by use of the method, loses all significance when we recall that the measures were made over a period of three and one-half years at fairly long intervals. Any method would have been equally effective, and indeed the naked eye would have sufficed. The value of chronaxie determination lies precisely in the fact that differences of reactivity are detected much sooner than with other methods, and with greater precision.

DR. R. RUIZ ARNAU: I only wish to say how much I appreciate the great honor the New York Electrotherapeutic Society has offered me by inviting me to take part in one of its meetings. I thank you very much.

DR. RICHARD KOVACS: I wish to thank the two gentlemen who gave us a very complete exposition of the subject. Dr.

Arnaud's clear presentation of the underlying physiological factors will be still better understood when the paper appears in print. Dr. Wechsler's compact and simple outfit is a pleasant surprise. When I visited the clinic of Bourguignon in Paris, one look at his highly complicated outfit was enough. I am anxious to give Dr. Wechsler's apparatus a trial, for I am convinced that Chronaxie testing has great possibilities and will give us more information than any of the current methods.

As to Dr. LeWald's inquiry about the mechanism of injury to the young man's brachial plexus: It must have been strain of the plexus, complicated by a hematoma, causing an immediate extensive paralysis. I agree with Dr. Stewart in that faradic-galvanic testing is still the simplest method to teach and to use in the average case of paralysis.

I owe a debt of gratitude to Dr. Hirsh, for his presentation of the condenser method—as practiced in the Army hospitals during and after the war—called my attention to it first.

DR. A. B. HIRSH: I feel that the profession ought to have a much wider knowledge of what these gentlemen have given us this evening by having these papers and discussion appear in some publication. I would suggest that all the papers might appear together, possibly with the discussion, in a medical journal having a wide circulation, and then have them appear in the form of a single reprint, if that were possible.

By request of several members, this suggestion was put in the form of a motion and carried unanimously.

### Reform in Attire of Men

Public health officials in Washington are advocating reform in men's dress that will in a measure keep abreast of women in plain sensibility. The assistant to the surgeon-general says that men should follow the example set by women. The clothing at present worn by men, particularly in the summer time, is unsuitable, uncomfortable, and unnecessary. The more freedom the body is given, and the more of the skin exposed to the air and sunshine, the more we favor health and development. Women are far ahead of men in the matter of sensible dress. Shorter shirt sleeves and fewer starched collars are the latest problems of men's clothing reform movement, and one official said, "If women are to be allowed freedom of the knees, why should not men at least be allowed freedom of the elbows and Adam's apple?" Dr. Eugene L. Fiske, medical director of the Life Extension Institute of New York, says that a man's shoes alone weigh four ounces more than the entire outfit of a woman.

Commenting upon the appropriateness of women's dress, its lightness, airiness and utility, a jester remarks that the dress on the average flapper reminds him of a barbed wire fence—it protects the property but does not obstruct the view! All joking aside, men, usually considered vindictive and less given to conventionalities, are a set of blooming idiots to follow the fashion dictates of the day concerning heavy clothing, starched collars, and other covering that is uncomfortable and unsanitary. We dislike to think of seeing hairy breasts, bony backs, and ugly looking legs of men who follow the example of women in the matter of dress, but we would like to see the men revise their dress so that they will be more comfortable than they are now with their superfluous clothing.—*The Journal of the Indiana State Medical Association*, September 15, 1929.

### 10,000 Private Physicians Begin Drive Educating Public on Preventive Health Measures

A new precedent has been established in the medical profession with the opening of a drive for public health education to be conducted by the private physicians of Greater New York. The ten thousand practitioners represented by the Five County Medical Societies of Greater New York are personally promoting a campaign for improving public health such as has heretofore been conducted only by government or institutional bodies.

The purpose of the campaign is to awaken the public to the value of preventive measures in maintaining health, and the role of the physician as a guardian against, as well as a curer of, disease. Efforts will be concentrated on teaching the importance of a periodic health examination as one of the chief means of warding off sickness or checking incipient diseases.

The Department of Health is supporting the project, which is also enlisting the cooperation of public schools; welfare, community, and social organizations; and public information organs such as the radio, the press, and the moving pictures.

### Abdominal Distention Complicating Pneumonia

Fine (*Med. Jour. and Rec.*, Jan. 1, 1930) shows that this condition is one of the gravest complications of pneumonia, especially in infants.



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## Proceedings of the New York Electrotherapeutic Society

In this issue publication of the Proceedings of the New York Electrotherapeutic Society begins. In view of the place held by electrotherapy in the realm of our physical resources this addition to the columns of the MEDICAL TIMES should enlist lively interest.

### The Transillumination of Veins

When the tissues underlying a vein belonging to the superficial system, or underlying a congeries of such veins, can be sufficiently transilluminated with an instrument so constructed that most of the light emitted by it is directed subcutaneously at right angles to the surface of the skin overlying the vein, and at a distance very slightly removed from the vein under scrutiny, enough of this light will usually be reflected and diffused under and around the vein to bring the latter into sharp definition. The relatively cool and highly efficient lighting systems now available, jacketed to the transilluminator's point of contact with the skin, make this procedure practical and simple.

If two such sources of light be employed, and held against the skin on either side of a vein such as the median cephalic, the vein will stand out in still more definite isolation, permitting of clear visualization.

Further, the subcutaneous transit of a needle toward and into the vein will be under good visual control.

Meanwhile the vein is fixed by the technic which "straddles" the twin lights over it. In some situations, where the tissues are flaccid and thin, one light can be used to good advantage and the fixation of the vein accomplished by deep unilateral pressure against tissues immediately adjacent to it; this angular pressure throws the light under the vein more effectively. This one-man technic is occasionally practicable in the case of the median cephalic vein, in which instance the left hand controls the single source of light while the needle is directed by the right hand, and it works fairly well at times in the injection treatment of varicose veins of the leg. Frequently, however, the light from a single source is obstructed by the vein itself, particularly where the vein lies close to bony or dense structures and hence cannot be made to stand out in relief.

Veins not ordinarily visible or palpable at all, particularly in well nourished women, frequently become startlingly distinct, with corresponding facilitation of venipuncture.

The room in which this procedure is applied should be fairly well lighted. A fair degree of light does not interfere with vascular visualization and the return flow of blood into one's syringe can be observed.

A tourniquet is not usually necessary. The needle may be inserted under the skin only, before transillumination, visualized puncture of the vein following.

If light is thus passed over the veins of the leg their structure in detail is clearly revealed—a great aid in the treatment of varicosities.

Compression of a transilluminated vein will sometimes serve to determine the direction of the blood flow—important in the treatment of varicosities.

The purpose sought in all these fields through transillumination is an accurate determination of the subcutaneous topography of normal and abnormal veins before, during and after venipuncture for any purpose.

In brief, this type of transillumination may be usefully applied at times in the following fields:

1. Visualized venipuncture in conventional intravenous therapy, particularly in the case of "difficult" veins.
2. Injection treatment of varicose veins.
3. Study, *in vivo*, of visible changes in the walls of veins subjected to frequent needle trauma and incidental chemical insult (e. g., some types of lues therapy) or to intensive injection treatment in the presence of varicosities.

### The Heritage of Hales

In the Province of Quebec, Canada, the Metropolitan Life Insurance Company lost only three of its policy holders as a result of alcoholism during the year 1929. The company has nearly 600,000 policy holders in that province.

Altogether, the company lost 641 policy holders as a result of alcoholism. Among approximately seventeen and three-quarter millions of policy holders in the United States, 628 of these 641 alcoholism deaths occurred, as compared with only eleven deaths among one and one-quarter millions of insured Canadians. During the eight-year period from 1922 to 1929 there were 4,138 deaths from this cause in the experience of the company. Of these, 4,087 occurred in the United States, as compared with only forty-eight deaths in Canada.

These statistics illustrate very well one of the differences that result from governmental policies with respect to liquor. In the one case we have wine and beer available, with correspondingly lessened consumption of hard liquor; in the other case little other than hard liquor is consumed.

One gets considerable light on this subject by studying the career of Stephen Hales, that genius who, early in the eighteenth century, measured blood pressure accurately, estimated the cardiac output, studied the blood flow through the tissues, elucidated muscular movement, noted the spinal reflex, described the ossification of bone, did pioneer research work on respiration, installed ventilating machines in prisons and ships, vastly advanced knowledge of the physiology of plants, helped to found the Colony of Georgia (with Oglethorpe), and initiated effective regulation of the liquor traffic in England. It is profitable to go back and see how wisely England, under the influence of this man, mitigated her then frightful liquor problem.

Hales was a pure scientist and clergyman, not a physician. Educated at Cambridge, he was imbued with the spirit of Newton, which accounted for his researches in pure science. The religious side of the man inspired his efforts to improve the condition of his fellow men. It was the latter motive which accounted for his successful work in promoting the Gin Act of 1736, which stopped "that profusion of spirituous liquors which threatened to ruin the morals and the constitutions of the common people." The Gin Bill laid a duty of 20 shillings a gallon on spirituous liquors, and all who sold them had to pay fifty pounds per annum for a license. *Wine was only moderately taxed.*

Alcoholism in the days of Hales was a much more dreadful thing than it has ever been since. The passion for drinking infected the masses of the population, and "spread with the rapidity and violence of an epidemic." Then the shops invited passers-by to "get drunk for a penny or dead drunk for two pence," and advertised "clean straw for nothing," on which to sleep off the effects of debauchery. The Gin Bill let the mob down easily with wine and beer. What wisdom there was in this arrangement!

Hales was not responsible for the prohibition against rum in Georgia. This was imposed by Oglethorpe, who believed that the consumption of alcohol would be excessive among settlers recently liberated from debtors' prisons, and would have a debasing effect. It seems fair to say that the dry States of the South and the rise of the fanatics date back to this prohibitory legislation. It was prohibition, not regulation, as in England, and it did not work, but this fact has never given pause to any fanatic.

One cannot but have an immense respect for this civilized man's work in the interest of temperance, however strange his American prohibitionist brood. Writing of his own youth, and of how he celebrated the taking of his degree at Cambridge, he says: "The exercise being over I kept my Feast where the Professor Dr. Green, and his namesake the Master of our College, favored me with their Company among the Rest of the Faculty in the University, and the Professor observed to me the next day that he never was so merry, nor stayed so long at any entertainment before. The Young Gentlemen of the University, who were Students in our Faculty or of my Acquaintance, I treated at the same time very plentifully in my own Chamber, and I think I went to bed the soberest of all the company."

It is in Canada, child of Britain, that the true spirit of Hales lives on, not in the United States, and the practical results may now be plainly seen by all men not wilfully blinded by fanaticism.

Let us re-echo the words of Wesley: "How well did science and religion agree in this man of sound understanding."

### The Cost of Medical Care

If one wanted to get cheap medical care it might seem advisable to go to a small town where the fees are low. However, there is another side to the question; many of these low fees are excessive. The physician who does not make a thorough examination, keeps no accurate case records, and gives his patient a hasty diagnosis is overcharging if he charges him one dollar a consultation. Tonsillectomies performed by inexperienced surgeons are often extremely expensive at twenty-five dollars if one considers the damage caused by incomplete enucleation. A large fee for a proper extirpation of the tonsil is much cheaper in the end than a small fee covering an incomplete operation. An infected stump left after partial tonsillectomy is a serious matter, for it may do far more damage than the original tonsil. It is often difficult to induce a patient to undergo a second operation, because the first one was unsuccessful. In many instances, surgeons who are thriving in small communities are expensive luxuries. Surgery should be done by a surgeon who is doing nothing else; not by a man who is treating septic throats and scarlet fever, and performs surgical operations as a side-line. In the long run, the seemingly expensive man, provided he is good in his field, is usually the least expensive. His charges often amount to less in the end than those of the occasional surgeon who is doing more casual work.—M. W. T.

### The Committee on the Cost of Medical Care

The work being done by this committee should interest every physician as it shows the extent of disease and disability requiring medical services, studies on the cost to the family of medical services and the return accruing to the physician and other agents furnishing such services, and analyses of specially organized facilities for medical care now serving particular groups of the population. Every physician should co-operate in this work as much as possible and the Committee (910 Seventeenth St., N. W., Washington, D. C.) will send a list of their publications to any physician who requests it.—M. W. T.

## Miscellany

### The Country Doctor

- If you can change tires at four below at four A. M.;
  - If you can set a fractured femur with a piece of string and a flat iron and get as good results as the mechanical engineering staff of a City Hospital at 10 per cent of their fee;
  - If you can drive through ten miles of mud to ease the little child of a deadbeat—
  - If you can do a podalic version on the kitchen table of a farmhouse with husband holding legs and grandma giving chloroform—
  - If you can diagnose tonsillitis from diphtheria with a laboratory forty-eight hours away,
  - If you can pull the three-pronged fish-hook molar of the 250 pound hired man—
  - If you can maintain your equilibrium when the lordly Specialist sneeringly refers to the General Practitioner—
- Then you are a real Country Doctor!—Public Health Nurse.



A METROPOLITAN SCENE.—THE ANTE-CHAMBER OF A POPULAR NEW YORK PHYSICIAN.—PATIENTS WAITING THEIR TURN FOR CONSULTATION  
*Reproduced from Frank Leslie's Illustrated Newspaper, August 9, 1870.*



### The Family Doctor

Some time ago we mourned the circumstance that specialists seem everywhere to be replacing the family doctor, leaving most of us with a consultant to depend on in every situation except when we are really sick. This lamentable trend, it seems, gives prospect of coming to an end, or at any rate of being somewhat arrested. Dr. Iago Goldstein, Secretary of the Greater New York Committee on Health Examinations, has issued a statement in which he says that periodic health examinations may turn out to be "the first practical step which organized medicine has undertaken in an effort to save the general practitioner from extinction and change him from an emergency doctor into a health counselor." If so, we rejoice, and all the more so if the idea has originated with the medical profession itself.

Manifestly, it was the medical profession, not its patients, who ushered in the present era of specialists. It saw, or rather its members individually saw, that specialties pay better, both in money and prestige, than general practice, and so naturally it became specialty-minded. If it sees advantages now in health counsel, we may have quite a crop of health counselors before long. And if citizens feel some injustice in paying for examinations when they are not sick, this strikes us as fair enough. Receiving no business when the weather was fair, but having to work at all hours when weather was foul, was not so good from the doctor's point of view, and probably had much to do with turning him into a specialist. Under the new scheme, apparently, doctor and patient will go fifty-fifty on the weather, and it looks like a better way all around.—*Eve. World.*

### What Price Public Health Education

Widespread *fundamental knowledge* of hygiene is necessary to insure public health progress. The writer has in mind two men, one a professor of Greek and Latin, the other a corporation lawyer, who, not so many years ago, took their children out of school,—because they did not believe in vaccination. Lack of intelligence could hardly be argued, but lack of a knowledge of the elementary principles of immunology could. Certainly we should teach in our schools more fundamental knowledge about the body, bacteriology, sanitation and the principles of healthful living. Study and effort must be applied by intelligent people in order to use knowledge to control conduct. No lesser price will purchase health. Appropriations of money are necessary but money alone cannot bring understanding. All that public health science offers should be secured for the community and public health officers need the stimulation and moral support of an understanding appreciation. The enlightened health officer may propose a new life-saving measure, but unless the people understand and approve, his labor is seriously discounted.

There is no dogma, "ism," cult, formula or set of rules that points the sure way to health. The benefits of the progress of science may be effectively blocked by a public that does not understand.—*Health News.*

### A BRIEF RESUME OF SOCIAL HYGIENE IN 1929\*

At the close of the old year it is fitting that we pause and survey the horizon—look again to the direction in which we are traveling, and consider how far and fast we have come on our road. For we have traveled.

Certain sign posts have appeared in the year 1929 as evidence of progress. We list some of these in the following pages.

\*Abstracted from Publication No. 668 of the American Social Hygiene Association.

**A New Emphasis in National Work.** The year has been notable for wide recognition of need for guidance of adults toward successful marriage and parenthood. To help meet this need a Division of Family Relations has been established by the Association. Page 6.

**Community Organization.** With the development of organized social work, the public has come to expect specialization. One result has been an increase in the number of social hygiene state and local societies. Page 11.

**Teacher and Leader Training.** Efforts to impress educators with their responsibility for sex education as a part of general education are bearing fruit. Page 4.

**Church Activities.** When the established branches of the church adopt a theory, it may be assumed an accepted principle. Page 5.

**"Look in the Encyclopedia."** The 1929 edition of the Encyclopedia Britannica contains two articles by Association staff members: "Control of Venereal Diseases in the United States," and "Social Hygiene."

**Progress in Prevention of Congenital Syphilis.** It is believed that good ground has been gained toward consummation of the hope expressed by Dr. Ray Lyman Wilbur—"When we can keep the spirochete of syphilis out of the body of every new born babe, we shall have added enough to human life and happiness to heal the wounds of the Great War." Page 9.

**For the Health of Seamen.** The Association has cooperated in a series of researches during the year, one of which has had a definite part in speeding up health efforts on behalf of merchant seamen. Page 10.

**Committee on Research in Syphilis.** The continued support of the Committee is evidence of recognition by a group of lay donors of the importance of discovering and testing improved methods of diagnosis and treatment. The Association has contributed to this research by providing certain secretarial and administrative facilities for the Committee.

**Progress in Providing Wholesome Environment for Youth.** Further recognition of the value of establishing and maintaining environments free from degrading influences for young people, is evidenced by the demand on the Association for and use of vice surveys, both in the United States and abroad.

**An Important Sign of the Times.** The organization of the President's White House Conference on Child Health and Protection expresses the considered judgment of the head of our government that the health and happiness of the child is of basic importance to the welfare of the nation, and that social agencies must aid in achieving this. The Association's General Director is a member of the Planning Committee, the Sub-Committee for Communicable Diseases, and a staff member is on the Sub-Committee for Delinquency.

### OUTSTANDING ACTIVITIES IN THE DIVISIONS

#### Educational Measures

**Teacher and Leader Training.** The most conspicuous trend in social hygiene education is the growing demand for teacher and leader training courses. It measures more accurately than anything else the results of pioneer labor.

Many prominent educational institutions requested such courses during 1929, and leader-groups included religious agencies, parent-teacher organizations and others.

**The Colleges.** The number of colleges accepting sex education as part of their education task grows steadily. Institutions not yet prepared to act are accepting the principle, and the need for arguing the responsibility is rapidly diminishing. The method advocated by the Association, namely, inclusion in courses in biology and physiology—as against special courses or lectures—is more and more established as sound. The growing number of courses on the family in which the sex factor is given full consideration is significant.

A gratifying interest in independent experiment is noticeable. The report, "The Colleges and Sex Education," distributed among 550 colleges has resulted in stimulating experimentation much more than in use of the exact plans and materials suggested. In order to assemble and disseminate the best experience, a study is being made of the status of sex education in the colleges.

Lecture and conference service has been continued.

**The Schools.** In the schools, too, the tendency grows to recognize sex education as a responsibility. There is a marked growth toward comprehensive and thorough instruction. Many inquiries are received from schools as to successful experience. To meet this demand the Association secured from fifty high schools information as to methods, subject matter and results. More requests have been received for suggestions, courses, outlines, literature and bibliographies to aid in sex education than in any previous year. The demonstration lectures and conferences by field staff members have met with sincere appreciation.

**Religious Education.** Until recent years religious agencies were less active than the schools. The present awakening of the religious education field to opportunity in this respect is therefore most gratifying. Agencies such as the Y. M. C. A., the Y. W. C. A., the Federal Council of Churches, leading church boards, city church federations, and individual churches are developing leadership within their own ranks, and are preparing materials for their needs.

The Protestant Episcopal Church has announced a plan—the Association cooperating—for developing education for marriage in its Greater New York parishes. In other states this denomination is trying to bring the study of sex problems more fully into the theological schooling of its ministry.

**The Parent-Teacher Organizations.** Progress has continued in establishing social hygiene as a systematic part of the parent-teacher program and activities.

Reports show marked increase in lecture-series, study groups, single talks and use of literature. Two states held one-day institutes for training leaders. Social hygiene featured at 14 state and 18 district conventions.

An outstanding event of the year was the presentation of a paper by an Association staff member before the International Federation for Home and School in Geneva, Switzerland, and his services on the Board of Managers of the Federation. He also conducted a six-session discussion group on sex education, during the World Conference of New Education held at Elsinore, Denmark.

**Educational Materials.** New pamphlet and exhibit material has been prepared, old editions revised, magazine articles written, and numerous courses, outlines and programs prepared upon call. The latter service, with the opportunity for personal conferences afforded by field visits of staff members, is one of the most important rendered by the Division.

#### Family Relations

The welfare of the family has always been a concern

of the Association and this Division has grown out of many studies made in past years. As early as 1917 a merger with one or more agencies dealing with marriage was under consideration. In 1925 the social hygiene organizations of the United States and Great Britain adopted a statement the first three objectives of which were:

"I. To preserve and strengthen the family as the basic social unit. II. To promote educative measures concerning the relations of the racial instinct to the conditions of civilized society. III. To emphasize the responsibility of the community and the individual for preserving or improving the quality of future generations by educative and social measures."

There are no topics, apparently, in the social field which awaken more intense interest than those which have to do with successful marriage and parenthood. Consultation services providing a direct approach to personality and family problems are in demand. The new division is studying all such activities to learn what is being done and what success attends the work.

#### Legal and Protective Measures

**Surveys.** The Association has continued to respond to requests by local organizations for appraisals of juvenile delinquency or commercialized prostitution conditions in their cities.

Studies of road house conditions are a new and interesting development. Local organizations in three states, and the state health officer in another state have asked the Association for such studies, including the relation to prostitution or sexual delinquency of conditions found.

The Legal Division participated in the extensive general social hygiene survey of Philadelphia.

The Association has continued cooperation with international agencies; and the action of the Council and Assembly of the League of Nations to extend to the Far East the international inquiry into the traffic in women and children may require still further aid from the staff.

A study of protective measures was made in Washington, D. C., for the Social Hygiene Society of the District of Columbia. As the first step in putting into operation the recommendations made, a three day Institute was held under the direction of an A. S. H. A. staff member. In Paterson, N. J., a similar study was made for the Girls' Advisory Bureau.

**Advisory Service, Conferences and Lectures.** Lecture audiences have included social hygiene associations, universities, Leagues of Women Voters, and other groups.

Advice has been given to many local organizations for whom surveys were made as to the best use of the facts obtained. Technical information and advice as to the existence, constitutionality and operation of laws and administrative measures has been given to numerous distant inquirers in this country and abroad. Searching questions concerning success of legal and protective measures in this country, and appeals for advice for dealing with acute local situations were numerous.

The annual compilation of social hygiene laws has been continued and assistance given in legislative campaigns when requested.

**Cooperation With New York Committee of 14.** In accordance with the policy of this Association to work with and through other organizations where possible, the cooperative project has been continued with the Committee of Fourteen, a law enforcement organization of long standing and influence in New York City.

The purpose of this project is to use New York City as a laboratory for intensive application of new investigation and law enforcement methods so that advice to other communities where effective similar organizations are built up, may be based on practical measures of proven value.

**Criminal Records Study.** Work on tabulation and analysis of data gathered in Detroit in 1926 and again in 1928 continued during the past year, and when complete should furnish information of great value as to the effect of repressive measures on the volume and types of sex offenses, and the venereal disease rate.

(To be concluded in April issue)

## The Physician's Library

**The Blood Picture and Its Clinical Significance.** (Including Tropical Diseases). A guidebook on the Microscopy of Blood. By Prof. Victor Schilling, Berlin; translated and edited by R. B. H. Gradwohl, M.D. The C. V. Mosby Co., St. Louis. 1929. Pp. 408. 44 illustrations and 4 color plates. Price, \$10.00.

This is an excellent work on practical hematology and the technic is well described. From the clinical point of view it will be of great value. The publishers have made the book a work of printing art, the illustrations in colors and in black being out of the ordinary. The author has given us the benefit of his long experience. In this seventh and eighth revised edition, the author has added many new things, among them additions to our knowledge of sedimentation, changes in the protoplasm of leucocytes, etc. The technic of blood examination is given clearly and in detail.

**Recent Advances in Medicine.** By Beaumont and Doods. P. Blakiston's Son and Co., Inc., Phila. 1930. Pp. 442. Price, \$3.50.

This fifth edition is welcome, giving as it does the modern progress of medicine during the past year, in a concise manner. The book is well arranged; in spite of the four hundred pages, the book can easily go in the pocket. The authors have included new laboratory methods and new sections cover nephritis, modified Sippy diet for gastric ulcer, and new methods of blood and urine analysis, and each chapter has been revised and additions made. It is a valuable volume for clinical and reference work and we highly recommend it.

**Chemistry in Medicine.** The Chemical Foundation, Inc., New York. 1929. Pp. 755. Showing the great possibilities for advance in medical science through intensive cooperation between chemistry and medicine.

**Bacteriology for Nurses.** By Harry W. Carey, M. D. 3rd Edition. F. A. Davis Co., Phila. 1930. Pp. 282. Price, \$2.25.

This book might well be used by physicians and students. Also any general practitioner who wishes to brush up on modern bacteriology might use this volume to advantage. It is well written, simply presented and well illustrated with forty-three engravings and one colored plate. Each chapter is followed by a series of questions. Nurses will welcome this new edition of a standard work.

**The Medical Museum.** By S. H. Daukes, Director of the Wellcome Museum of Medical Science. The Wellcome Foundation, Ltd., London.

Shows the general scheme of this museum, methods of arrangement and display, general methods of preservation, special methods of preparation, methods of mounting, labelling and classification, etc.

**The Care of the Nose, Throat and Ear.** By W. Stuart Low. 2d edition. Bailliere, Tindall and Cox, London. 1929. Pp. 89. A valuable book for the layman.

**An Outline of Endocrinology.** By W. M. Crofton. 2nd edition. Wm. Wood & Co., New York. Pp. 163. 1929. Price, \$3.00.

Considers the pineal gland, pituitary, suprarenal, thyroid, parathyroid, thymus, gonads, hormones of the gastro-intestinal tract, the pancreas and liver, and presents supplementary notes on recent advances. Interesting.

**Research and Medical Progress and Other Addresses.** By J. Shelton Horsley. The C. V. Mosby Co., St. Louis. 1929. Pp. 208. Price, \$2.00.

A series of lectures and addresses by Dr. Horsley, of Richmond, Va. It is extremely interesting and valuable to any practitioner. The chapters on peptic ulcer and cancer of the stomach are masterpieces. One address on "Stomach trouble" is especially well worth reading. Considerations on the treatment of cancer are given and modern methods of preoperative and post-operative treatment. Dr. Horsley is one of the reviewer's favorite authors. He always has a message and expresses himself clearly. I sincerely hope that Dr. Horsley will add to these researches in another edition.—M. W. T.

**Disorders of the Sexual Function in the Male and Female.** By Max Hühner, M.D. The F. A. Davis Co., Phila., 1929. Pp. 342. Third edition.

In this edition the author has added a new chapter on dysmenorrhea and its treatment. In most of the volume about half of the discussion is given to treatment. This is an exhaustive study of this subject.

**Clinical Obstetrics.** By Dr. Paul T. Harper, Prof. of Obstetrics, Albany Medical College, F. A. Davis Co., Philadelphia. 1930. Pp. 629. 84 plates of engravings (250 figures). Price, \$8.00 net.

Obstetrics from the clinical point of view and one of the best books for the practitioner we have seen. The author writes well, wastes no space and takes advantage of his own experience. He devotes, for example, 48 pages to Hemorrhage and covers it admirably. Other chapters are equally valuable. Highly recommended.

### The Renaissance of General Practice

Whether we like it or not, the centre of gravity of medicine is shifting from the home to the hospital and clinic. The first result of this is that the profession will be unable to go on doing its hospital work for nothing and will increasingly demand payment for services rendered in institutions; the second result is a narrowing of the confines of general practice which will ultimately destroy the efficiency of all who are isolated from hospitals. The problem of payment for institutional treatment is being solved on orderly lines in the course of social evolution, but the problem of the private practitioner's isolation presents itself urgently in connexion with the Local Government Act which will come into force in April. It may not be strictly true to say, with one of the speakers at last week's Panel Conference, that this Act will provide hospitals for everybody, from duke to dustman, but it will certainly set free a very large number of beds to meet the public demand. This will have the effect of popularizing hospitals still further, and if no attempt is made to bring the general practitioner into their working it will separate him yet more widely from truly general practice. If the family doctor is to look after nothing but minor complaints, if he is to surrender his patient during every illness, if he is to be kept out of the multifarious activities of the public health service, if he is to have no access to special means of investigation and treatment, then he stands little chance of being a good doctor. While very many have these facilities at cottage hospitals and elsewhere, and make good use of them, the majority of medical men are in no direct relation with hospitals. If local authorities choose the easy course and indiscriminately staff all their institutions with whole-time officers, the present opportunity of a renaissance of general practice will be lost—and such an opportunity may not occur again. It was on some such conclusion that the Panel Conference passed a resolution requiring an institutional position for the family practitioner.

But, of course, it is one thing to pass resolutions and quite another to translate them into action. What sort of hospital is the general practitioner to enter, and what is he to do when he gets there? Clearly no one would care to thrust him into the organization of the great voluntary hospitals, and it may be asked whether he has in fact a function in anything bigger than a cottage hospital. If he has no place in the large institutions under natural conditions, ought we to provide an artificial environment in which he will thrive? Is the family doctor engaged on work of such national importance that he should be protected; or is free trade in medicine ultimately best for consumer and profession alike? These questions will have all sorts of answers in different minds, in different parts of the country, and in different circumstances. Even now we can find object-lessons in plenty if we look for them. There are already poor-law institu-

(Concluded on Adv. page 20)



